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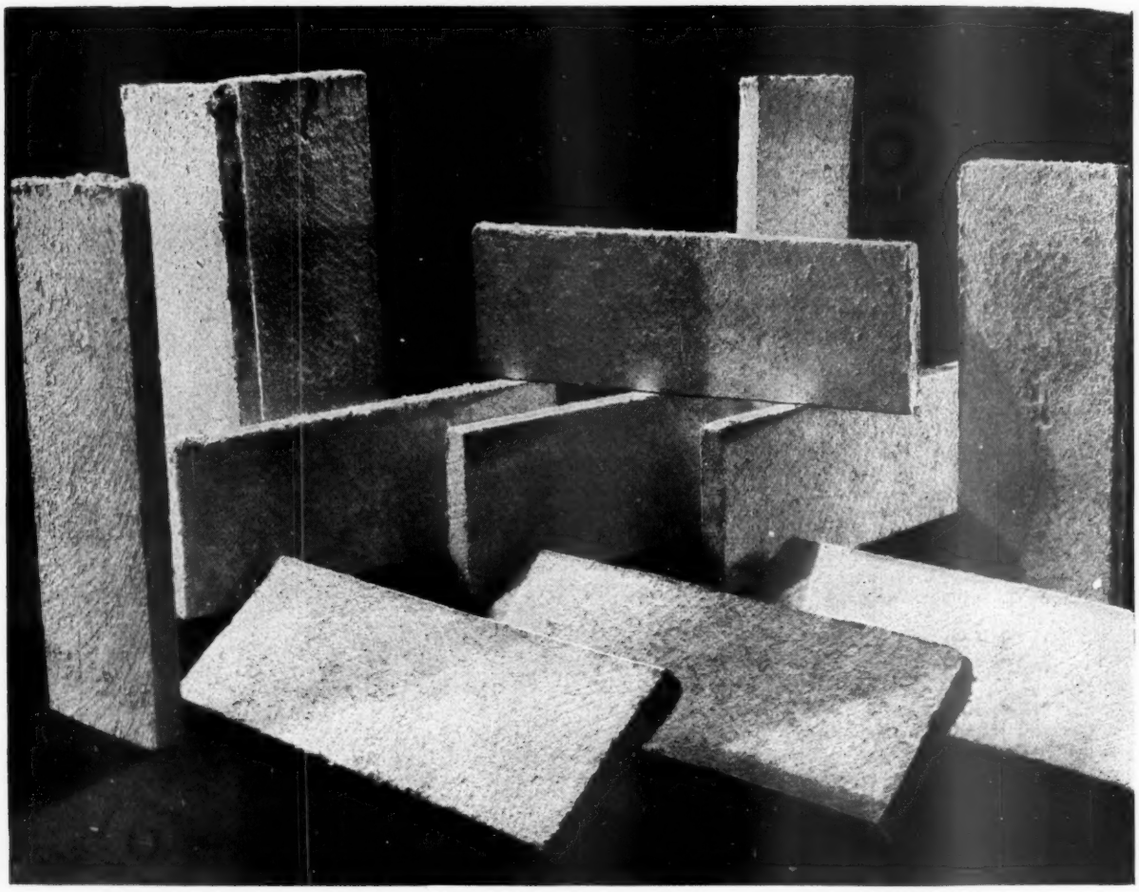

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RAILWAY AGE

The Proposed Rule of Rate-Making

The most important existing provision of statutory law regarding railway regulation is Section 15-A of the Transportation act, which contains the rate-making and recapture provisions. The most important question affecting the future of the railroad industry is as to how rates are going to be regulated. The House Committee on Interstate and Foreign Commerce recently has been holding hearings upon the question of revising or repealing Section 15-A. Those who have given their views to the committee include Commissioner Joseph B. Eastman of the Interstate Commerce Commission; John E. Benton, general solicitor of the National Association of Railroad and Utilities Commissioners; R. C. Fulbright, counsel for the National Industrial Traffic League, and A. P. Thom, general counsel of the Association of Railway Executives. There have been wide differences in the views expressed in the past by these four men regarding the way in which the railways should be and were being regulated by the Interstate Commerce Commission. Therefore, the news published in the *Railway Age* last week that they had virtually agreed upon a "flexible" rule of rate-making that should be substituted by Congress for Section 15-A was somewhat startling to many persons who are deeply concerned regarding the future of the railroad industry.

Present and Proposed Rules of Rate-Making

The proposed new rule of rate-making would completely repeal the present provision for the recapture of one-half of the earnings made by any railway in any year in excess of six per cent. Mr. Thom, in submitting a draft of the proposed new rule made by himself, emphasized that it would be acceptable to the Association of Railway Executives only upon condition that recapture would be abolished retroactively as well as for the future. The present rule of rate-making of the Transportation act, exclusive of the recapture provisions, and the proposed new rule as expressed in Mr. Thom's language, are as follows:

PRESENT RULE

"In the exercise of its power to prescribe just and reasonable rates the commission shall initiate, modify, establish or adjust such rates so that carriers as a whole (or as a whole in each of such rate groups or territories as the commission may from time to time designate, will, under honest, efficient and economical management, and reasonable expenditures for maintenance of way, structures and equipment, earn an aggregate annual net railway operating income equal, as nearly as may be, to a fair return upon the aggregate value of the railway property of such carriers held for and used in the service of transportation: Provided, That the commission shall have reasonable latitude to modify or adjust any particular rate which it may find to be unjust or unreasonable, and to prescribe different rates for different sections of the country.

"The commission shall from time to time determine and make public what percentage of such aggregate property value constitutes a fair return thereon, and such percentage shall be uniform for all rate groups or territories which may be designated by the commission. In making such determination it shall give due consideration, among other things, to the transportation needs of the country and the necessity (under honest, efficient and economical management of existing transportation facilities) of enlarging such facilities in order to provide the people of the United States with adequate transportation."

PROPOSED RULE

"In the exercise of its power to prescribe just and reasonable rates, the commission shall give due consideration, among other things, to the existing needs of the public for adequate and efficient transportation facilities and service, to the necessity for enlarging and improving such facilities and service to provide for the growing transportation needs of the public, to the effect of the proposed rates on the movement of traffic and to the necessity, in the public interest, that the carriers furnish transportation service at the lowest rates consistent with adequate service and adequate provision for the transportation needs of the public; and the commission shall, so far as practicable, initiate, modify, establish, or adjust rates so that the revenues derived therefrom will, under honest, efficient, and economical management and reasonable expenditures for maintenance of way, structures, and equipment, constitute a sufficient basis for the maintenance of a national system of railway transportation at all times adequate to the needs of the public: Provided, That the commission shall have reasonable latitude to modify or adjust any particular rate which it may find to be unjust or unreasonable, and to prescribe different rates for different sections of the country. It is hereby declared a sound principle of rate-making that carriers shall, in times of economic prosperity, be permitted to make earnings which will, as far as practicable, avoid the increase of rates in time of economic depression. To that end, it is hereby declared the duty of the commission, in the exercise of its sound discretion, to maintain as far as possible a general level of rates which, over a reasonable period of years, will produce revenues consistent with that standard."

It is only fair to say that in 1919, with the exception of one member, the executive committee of the Association of Railway Executives opposed the adoption of Section 15-A; that its successful advocacy was conducted mainly by the National Association of Railroad Security Owners; and that the *Railway Age* at that time supported the policy favored by the latter

organization. Nevertheless, it is also a fact that throughout the last twelve years practically all spokesmen of the railways, regardless of differences regarding recapture of earnings, have opposed repeal of the rate-making provisions of the Transportation act. Why, then, has the Association of Railway Executives now authorized Mr. Thom to agree to such a new rule of rate-making as that above quoted?

Reasons for Change in Railway Attitude

First, the railways wish to avoid recapture of past earnings, which the Interstate Commerce Commission has estimated would amount at the most to $378,400,000. The recapture provisions were based upon the assumption that the railways would be allowed to earn a fair return as defined by the Transportation act. They have never earned it. Therefore, for the government to recapture past earnings, especially under present railway conditions, would be the most high-handed robbery. There is, however, no certainty that the amount mentioned or any amount approaching it actually could be recaptured, because recapture must be based upon the valuation of each individual road, and no final valuation of any individual road made by the Commission has been upheld by the courts. Nevertheless, the fear of recapture of past earnings felt by many railways is very real, and under present conditions helps to destroy their credit.

Second, the existing rate-making provisions require the fixing of rates on a constitutional valuation, while ever since the Supreme Court rendered its decision in the O'Fallon case the commission has advocated legislation to authorize it to adjust rates on a so-called "rate base", which would represent its own ideas instead of those of the Supreme Court as to what a valuation ought to be. Those representing the railways before congressional committees have decided that they must choose between legislation authorizing use of the commission's so-called "rate base", and legislation establishing a new "flexible" rule of rate-making which would eliminate not only recapture, but also the question of valuation or a rate base; and they have accepted the latter alternative.

Let us now compare—or contrast—the present rule of rate-making and the "flexible" rule proposed.

The present rule means the same thing to everybody, excepting that there are differences of opinion as to how a fair valuation should be made. It is a clear statement by Congress as to how rates can be so adjusted as to enable all the railways in a group, or in the country, to earn, on the average, a constitutional fair return, as defined by the Supreme Court, and a direction from Congress to the commission to so make rates as to produce that result. This is exactly why Messrs. Eastman, Benton and Fulbright want the present rate-making provisions repealed. In other words, they want them repealed because they do not want the commission definitely directed by Congress to give the railways opportunity to earn a fair return as defined by the Supreme Court of the United States.

It is said that the present rule has proved unworkable. It has not proved unworkable. It has not produced the results intended by Congress when it was adopted in 1920 because the Commission has made no real effort to carry it out; and it is significant that in every important rate case under the Transportation act Messrs. Benton and Fulbright have appeared against the railways to help keep it from being carried out, and that Mr. Eastman has exerted more influence in keeping it from being carried out and in trying to get it abolished than any other man. How the rule would have worked if the Commission had tried to make it work nobody knows.

Effect of Proposed Rule of Rate-Making

What would be the effect of the adoption of the proposed "flexible" rule? What does it mean? Probably the best answer to these questions is that Messrs. Eastman, Benton, Fulbright and Thom now virtually agree upon the language of the rule that should be adopted. These men always have differed regarding the way in which the railways should be regulated. It can hardly be assumed that they have suddenly agreed upon this important matter. The unavoidable conclusion is that the proposed rule means something different to each of them, and that each of them anticipates, or at least hopes, that under it the railways would be regulated as he believes they should be regulated. A rule so "flexible" that men holding such divergent views as to the way in which the railways ought to be regulated, would be, in its practical interpretation and application, very "flexible", indeed!

The power of decision as to what it meant would rest, first, with the commission, and finally, with the Supreme Court. In our opinion, it would as a practical matter, give virtually unlimited discretion to the commission to regulate railway rates and earnings according to its own judgment. What, then, would be the commission's judgment? All experience indicates that it would be the judgment of eleven men selected largely regardless of their qualifications, usually entering upon their work as commissioners with anti-railway prejudices, and never learning enough about the railroad business to determine what earnings would be needed to "constitute a sufficient basis for the maintenance of a national system of railway transportation" or developing enough courage to let such earnings be made. The principal reason given by representatives of the railways for deciding it would be expedient to accept a "flexible" rule is that they had to choose between this and legislation authorizing adoption of the commission's "rate base" scheme of regulation. As the commission never has receded, even in the present hearings, from its position that regulation in accordance with its "rate base" formula would be liberal enough, what reason is there for expecting or hoping that under a rule giving it virtually untrammeled discretion it would not actually

apply its "rate base" formula or follow an even less liberal policy?

It may be answered that the new rule would contain the important provision "that carriers shall, in times of economic prosperity, be permitted to make earnings which will, as far as practicable, avoid the increase of rates in time of economic depression." But the commission has had full power under the Transportation act to do this very thing, and nevertheless, in years of prosperity it persistently restricted the railways to less than a fair return, the present railway financial situation being the result. It is also said in advocacy of the proposed new rule that the railways have failed to earn a fair return under the Transportation act because the commission in the past actually has exercised its own discretion, the implication apparently being that it could not do any worse under a "flexible" rule that it has under the present rule. But is the fact that the commission has refused to obey a law that is definite and sound a valid argument for substituting for it a law that will empower it to exercise in future a discretion that it has exercised in the past unwisely and in disregard of law?

If Not a Fair Return, What Return?

The adoption of the proposed flexible rule would have one advantage—that of eliminating recapture. The present rate-making rule, including recapture, if carried out, would give the railways a much larger net operating income than they have earned during the last eleven years. Therefore, the elimination of recapture for the past and future can be held to be of paramount importance only upon the assumption that, *whatever the law may be, it will be the policy of the commission in future not to let the railways earn a fair return upon a fair valuation;* and therefore acceptance by the railways of the proposed new rule will be virtually a concession by them that they do not expect the commission to allow them to earn a fair return. If this is what acceptance and adoption of the new rule will mean, what will be the value of the pious injunction to the commission to let the railways make enough earnings to "constitute a sufficient basis for the maintenance of a national system of railway transportation"? It is an absolute contradiction to concede that the railways will be restricted to less than a constitutional fair return and at the same time provide that they shall be allowed to earn enough to furnish adequate and economical transportation.

Three different policies regarding railway rates might be adopted by Congress. First, it might restore the initiative in rate-making to the railways by withdrawing from the commission the power to suspend changes in rates. Second, it might continue, as in the Transportation act, to give a mandate to the commission to so adjust rates as to enable the railways to earn a fair return as defined by the Supreme court. Third, it might adopt a "flexible" rule such as is proposed. The first of these would be the best policy. The second would be the next best because, while fully empowering the commission to fix rates, it gives it a statutory mandate to fix them in accordance with economic requirements and the established law of the land. The third, or flexible rule, policy would be the worst that could be adopted because it would be simply a policy of paternalism—of giving the commission a despotic power over railway earnings from which there could be no effective appeal.

To Whom Can the Railways Appeal?

Contrast the situation in which the railways now find themselves with that in which they would be placed by the proposed rule of rate making. Their case must be tried now and in future in two forums—that of the courts and of public opinion. Their counsel can now appeal to the courts upon the ground that the Commission is not obeying a definite statutory rule laid down by Congress. There could be no appeal on that ground under the proposed rule, because the Commission would be authorized and directed by statute to act in accordance with its own discretion. There could be virtually no appeal to the courts excepting on the ground of confiscation in violation of the constitution, and experience clearly shows how difficult it is to prove such confiscation in the courts when the rates to be charged by two or more parallel railways are in question.

Under the Transportation act it has been possible for spokesmen of the railways to produce some effect upon public opinion by citing the statutory rule and showing by actual and incontrovertible statistical evidence that the Commission has not even let the railways earn anywhere near as much as the Commission has repeatedly conceded that they have lawfully been entitled to earn under that rule. Under the proposed rule it would be impossible to make any such appeal to public opinion and support it with convincing facts. How could the commission be effectively criticised to the public for exercising its own discretion in carrying out a law which expressly authorized and directed it to exercise its own discretion? The only evidence that could be offered that it had exercised its discretion unwisely or unfairly would be that railway transportation had broken down, and what good would it do to use such evidence after railway transportation actually had broken down?

In the eleven years ending with 1907, in the early part of which period the railways were recovering from the depression of the nineties, and during most of which they were not subject to effective regulation, they earned an average return upon property investment of 4.95 per cent. In the eleven years ending with 1917, throughout which period they were subject to effective regulation, they earned an average return on property investment of 4.92 per cent. It was largely because the inadequate return earned from 1910 to 1917 under effective regulation had created mistrust among investors that the rate making provisions of the Transportation act, assuring opportunity to earn a fair return in future, were

adopted by Congress in 1920. In spite of this legislation, and principally because the Commission refused to carry out its provisions, the average return earned on investment in the eleven years ending with 1931 was only 4.10 per cent. The commission knew throughout this time that the recapture provisions were in effect; and if the maximum amount of earnings made during this period that it now estimates were subject to recapture actually were recaptured, the return left to the railways for that period would average only 3.95 per cent upon investment. The difference between a fair return of 5¾ per cent and the return actually earned during this period was about $3,500,000,000. Nevertheless, after all this experience, the railways are about to agree that the commission should be authorized to exercise, in accordance with law, the same kind of discretion and judgment that it has exercised in the past in disregard of law.

Perhaps under the new law, which would give the commission virtually despotic power over railway earnings, it would be a benevolent despot. Perhaps after Congress had withdrawn its irritating instructions to let the railways earn a fair return the commission would let them earn even more than a fair return. Perhaps the *Railway Age* has too little confidence in the paternal care that a bureaucratic government commission which, regardless of law, has restricted a great industry to 4 per cent, will show for that industry after it has surrendered at discretion and thrown itself upon the mercy of bureaucracy. But the records of the Commission, and especially of Commissioner Eastman, Mr. Benton and Mr. Fulbright, do not inspire us with the same confidence with which they apparently inspire those who are now determining the railways' attitude toward regulation. Peace between Commissioner Eastman, Mr. Benton, Mr. Fulbright and the railways, after all these long years of struggle, is highly desirable;—but we fear that after the railways have made their peace by surrendering their shirt to these estimable and now friendly men, they should keep a tight hold on their trousers, or they may find themselves left entirely naked before the world.

A New "Deal" on Train Control

The decision of the Interstate Commerce Commission permitting the Great Northern to discontinue the operation of its intermittent automatic train stop equipment places an entirely new aspect on the train control situation. However, a careful reading of the decision brings out the fact that the commission has not "taken off the lid." Rather it has acceeded to the contention of the Great Northern that, under certain conditions of minimum traffic on a line in open territory, the money required for the maintenance and operation of train stop equipment might better be spent for other means of increasing safety, such as for automatic block signals or highway crossing protection, the intimation being that the railroad is to pursue an active program of extending such protection in lieu of continuing the operation of the train stop system. Certain other roads operating under conditions similar to those of the Great Northern may petition the commission to remove from service the train stop or train control systems on their lines, and their cases will no doubt be decided on the same basis.

On the other hand, certain roads on which continuous train-stop or train-control systems are in service have stated that the cab signaling, which was developed as an accessory to train control, has gradually proved to be of more practical service than the automatic brake application features of the system, and these roads may desire to eliminate the automatic brake application feature but continue in service the cab signal system. To a certain degree, the commission decided in favor of such a change on February 6, 1931, when it granted a petition of the Pennsylvania to operate, in interdivisional runs over territory equipped in part with train control devices, locomotives equipped with the continuous system of four-indication cab signals, but without brake-applying apparatus.

It might be said that the purpose of the original orders of the commission, requiring the roads to make extensive installations of train control, was to insure its thorough development and trial. It is common knowledge that the several types of train control that are now in service perform the functions intended with a reliability comparable with that of other signaling facilities. The evident purpose of the commission has, therefore, been accomplished and it is now the responsibility of the individual carriers to undertake measures to extend the train-control installations or to remove those now in service as conditions warrant. In other words, the train control "shoe" is now on the other foot, but the commission still has a "string" on it.

Standards of Living of Railway Employees

The International Labor Office at Geneva has recently completed and published the results of the first thoroughgoing attempt ever made to compare living costs between the United States and various European countries. In 1929 the Ford Motor Company of Great Britain requested information from the International Labor Office relative to the wage rate which would be required in certain specific European cities to provide the same relative standard of living which a given money wage would make possible in Detroit, Mich. The office was able to supply some information but it was not complete. A philanthropic contribution, how-

ever, was made available to the office which, thus financed, undertook the study.

Numerous difficulties faced the inquiry, since the manner of living of the people in different countries varies so widely. Steps were taken, however, which need not be gone into here, to make the findings as accurate as possible, and it may be assumed that the figures are safe to use for comparative purposes once the necessary limitations are understood. Most of the European figures exclude certain expenditures for social insurance which are borne by the state and which have no counterpart in Detroit.

The figures disclose that, with cost of living in Detroit taken as 100, the relative percentages in January, 1931, expressed in a common currency, for the same standard of living in various European cities was as follows:

City	Comparative Figures	City	Comparative Figures
Berlin	83-90	Antwerp	61-65
Frankfort-a.-M.	85-93	Rotterdam	65-68
Copenhagen	83-91	Manchester	71-74
Stockholm	99-104	Cork	85
Helsinki-Helsingfors	83	Warsaw	67
Paris	80-87	Barcelona	58
Marseilles	75-81	Istanbul	63

Such figures being available, they may, perhaps, be used to throw some light on the relative standards of living available to various classes of railway employees in the several cities mentioned (provided living costs shown for the cities are fairly comparable to those of the countries in which they lie). Unfortunately, comparable money wages of similar classifications of employees are not readily available for all the countries. Official figures for two countries, Great Britain and Germany, however, have been published in a manner to make possible some measuring of real wages of railroad workers in those countries as compared with those in the United States.

The classification of employees used by the German Reichsbahn's wage statistics was used as the standard since it was subdivided the least. The comparisons are set forth in the accompanying table. First, the average annual earnings of trainmen, firemen, clerks and enginemen are shown, converted into American dollars. In the second column is shown, in dollars, the purchasing power which the earnings of each class would represent in Detroit. Next is given the average earnings in 1930 of similar classes of employees in the United States and, then, the percentage by which the purchasing power of the American worker exceeds that of the same class in Germany. The table then shows similar comparisons for Great Britain.

The German statistics do not give annual earnings for skilled, semi-skilled and unskilled workers, but only the hourly earnings. There being no American classification so inclusive, machinists, helpers and section laborers are used in the comparisons. Using the figures for machinists probably overstates somewhat the earnings of skilled workers in general.

Average hourly earnings for these same classes in Great Britain were not given and the figures shown were obtained arbitrarily by dividing the weekly earnings by 48. The occupations in Great Britain and the United States, however, are closely comparable, the earnings of "fitters" being compared with those of machinists, "fitters' assistants" with skilled trades helpers and "permanent way undermen" with section laborers. Conductors earnings were left out of the computation of trainmen's wages in the United States.

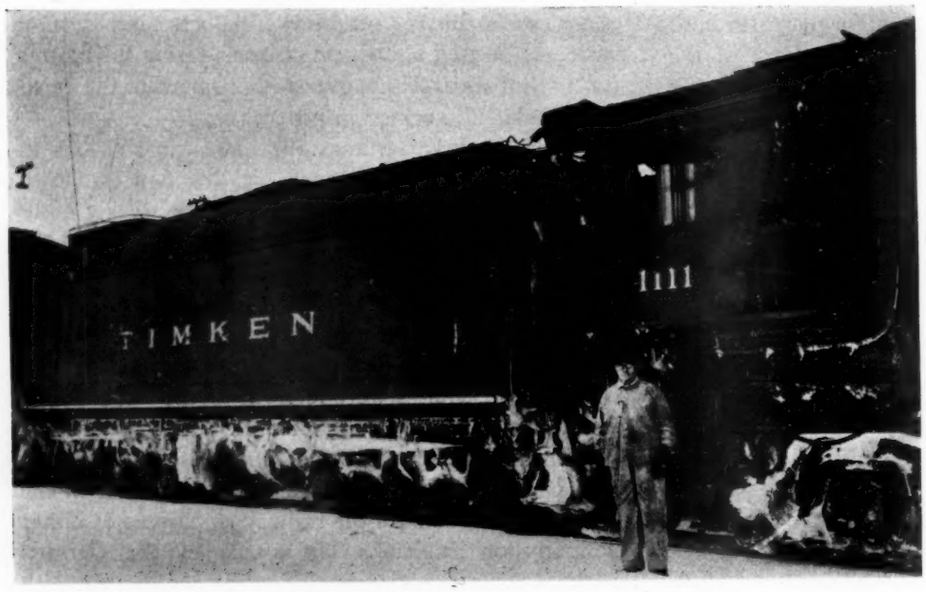
With all its limitations, the comparison shows that most classes of employees are vastly better off in the United States than are the railway employees of either Germany or England. The status of the German workers appears astoundingly low by comparison with that of either the British or the American. Two classes —clerks and common laborers—have apparently a relatively much higher position as compared with their fellow employees than obtains with us. As for the clerks, a possible explanation might be a policy which makes it somewhat more difficult than it is with us for manual workers to enter the domain of the "white collar" class. The relatively more favorable position of unskilled labor undoubtedly springs from the homogeneity of the population, and the absence of alien or colored workers.

In any event it is evident that American railway employees, on the whole, have much cause for gratification in the high standard of living which they have achieved—a standard which in most cases could fall materially and still be far above that obtaining in Europe. And such wage reductions as have been made since the compilation of these figures have been fully offset by the decline in the cost of living.

	Avg. Annual Earnings in Germany in 1930 (a)	Amount Required for Equivalent Purchasing Power in Detroit (b)	Avg. Earnings of American Ry. Employees in 1930	Percentage by Which Living Standards of Each Class in U. S. Exceeds That of Same Class in Germany	Avg. Annual Earnings in Great Britain (j)	Amount Required for Equivalent Purchasing Power in Detroit (p)	Percentage by Which Living Standards of Each Class in U. S. Exceeds That of Same Class in Great Britain
Trainman	$756.84	$850.38	$2078.86 (c)	144.4	$939.85 (k)	$1296.34	60.4
Fireman	809.68	909.75	2185.47 (d)	140.2	1019.14	1405.71	55.4
Clerk	832.52	935.41	1666.98 (e)	78.2	1093.14 (l)	1507.77	10.6
Engineman	1019.59	1145.60	3005.91 (f)	162.4	1305.64	1800.88	66.9
	Per Hour Cents	Per Hour Cents	Per Hour Cents		Per Hour Cents	Per Hour Cents	
Skilled Worker	24.04	27.01	83.20 (g)	208.0	40.87 (m)	56.37	47.6
Semi-skilled Worker	20.47	23.00	58.95 (h)	156.3	30.42 (n)	41.96	40.5
Unskilled Worker	17.85	20.05	36.25 (i)	80.8	26.35 (o)	36.34	...

(a) R. M. to $ at 23.8 cents. (b) 89 being the average index for the two German cities, the figures in this column are arrived at by multiplying the earnings (stated in dollars) in Germany by 100/89. (c) Passenger, through freight and local freight, excluding yardmen and conductors. (d) Passenger, freight and yard. (e) Clerks, Classes A, B and C averaged. (f) Passenger, freight and yard. (g) Machinists. (h) Skilled Trades Helpers. (i) Section Laborers. (j) Average earnings of each class (except last three) for the week ended March 7, 1931, multiplied by 52.143 and converted to dollars at 24.33 cents to the shilling. (k) Guards. (l) All grades averaged. (m) Fitters. (n) Fitters' Assistants. (o) Permanent Way Undermen. (p) 72.5 being the average index for Manchester, these figures are obtained by multiplying the British earnings (stated in dollars) by 100/72.5.

Timken Locomotive Completes First 100,000 Miles of Service



The End of the First 100,000 Miles*

Service on 13 roads over 21-month period produces interesting data on performance of all-roller-bearing locomotive

ON January 4, 1932, while in service on the Northern Pacific, the Timken roller bearing locomotive, the first steam locomotive to be completely equipped with anti-friction bearings on all locomotive and tender wheels, established what is believed to be a record in American railroad history—100,000 miles of actual road service hauling both passenger and freight trains on 13 railroads over a territory extending from Portland, Maine, to Seattle, Wash. During this time it was assigned to the handling of some of America's best known trains—under all kinds of operating conditions; over all kinds of grade and curve conditions; manned by strange crews and maintained by strange terminal forces—a tribute both to the engineering genius of its designers and to the operating ability of railroad men.

The Timken locomotive has been in service 21 months and, during that time, has been operated on the following roads in passenger service: Pennsylvania; Chesapeake & Ohio; Erie; New York, New Haven & Hartford; Delaware, Lackawanna & Western; Lehigh Valley; Missouri Pacific; Chicago, Burlington & Quincy, and Northern Pacific. In addition to having operated on the foregoing roads in freight service as well as passenger service, the locomotive was used in freight service only on the following railroads: New York Central; Boston & Maine; New York, Chicago & St. Louis (Nickel Plate); and Chicago & Alton. At the time this article was written the locomotive was still in service on the Northern Pacific. In addition to the actual road service on the above mentioned railroads the locomotive made a trip, light, over the Delaware & Hudson for a total distance of 148 miles.

On January 4, 1932, the Timken locomotive had completed a total of 100,319 miles of road service, 51,655 of which was in freight service and 48,664 miles in passenger service. During the period from April 4, 1930, to January 4, 1932, a total of 555 runs in service had been completed, involving the handling of 27,356 freight cars and 2,431 passenger cars.

New York Central

The New York Central test comprised 44 runs in freight service covering a total mileage of 6,582. Trains as heavy as 125 cars and maximum tonnages of 6,283, including the locomotive, were handled on this road. The total number of cars handled was 4,561 and the total tonnage, including the locomotive, was 169,840. The car-miles totaled 632,753 and the gross ton-miles totaled 24,942,033. This work was handled with an average coal consumption of 48.68 lb. per thousand gross ton-miles at an average speed for all trips of 28.26 miles per hour. Water consumption averaged 6.88 lb. per lb. of coal and the train performance was at the rate of 78,931 gross ton-miles per train-hour. The service on the New York Central covered the period from April 4, 1930, to May 21, 1930, over districts between New York and Buffalo, N. Y.

Pennsylvania

The Pennsylvania freight record covers 45 runs totaling 10,667 locomotive miles during which a total of 4,558 cars were handled comprising a total tonnage of 195,937. Car-miles amounting to 931,342 were run, equaling 39,910,360 gross ton-miles. The average coal consumption on the Pennsylvania was 50.51 lb. per thousand gross ton-miles, including the locomotive, and

* Locomotive No. 1111 arriving at Jamestown, N. D., after hauling Northern Pacific Train No. 1 from St. Paul, Minn. Charles York, engineman, is standing on the steps and behind him, fireman Philip McManus. Road foreman W. J. Ridley is on the ground.

the average freight train speed was 29.64 miles per hour. The evaporation rate was 7.36 lb. of water per lb. of coal. The gross ton-miles per train-hour on this road averaged 80,078. The freight runs on the Pennsylvania were over the following districts: Harrisburg, Pa., and Altoona; Enola, Pa., and Jersey City, N. J.; Crestline, Ohio, and Chicago; and Columbus, Ohio and St. Louis, Mo. The maximum number of cars handled at any one time on this road was 148 and the maximum tonnage handled on any one train was 8,625.

On June 12, 1930, the Timken locomotive handled a 115-car train of 8,625 tons on a non-stop run from Altoona, Pa., to Enola—a distance of 124 miles. The average speed for this run was 25.7 miles per hour and the average evaporation was 8.33 lb. of water per lb. of coal. The gross ton-miles per train-hour, exclusive of the locomotive on this trip, was 221,427. On another run on the Pennsylvania on August 13, 1930, the locomotive handled a 102-car train of 3,986 tons over the territory from Crestline, Ohio, to Fort Wayne, Ind., a distance of 131 miles. The grades in this district vary from level to 0.6 per cent maximum. The average speed was 41.5 miles per hour, the evaporation 8.2 lb. and the gross ton-miles per train-hour 165,457.

Passenger Service

A total of 23 runs was made in passenger service on the Pennsylvania, involving 7,871 locomotive miles and a total of 289 cars, equaling 94,744 passenger car-miles. The average train speed in passenger service for all runs was 45.89 miles per hour. The coal consumption averaged 7.77 per passenger car-mile and the evaporation 8.24 lb.

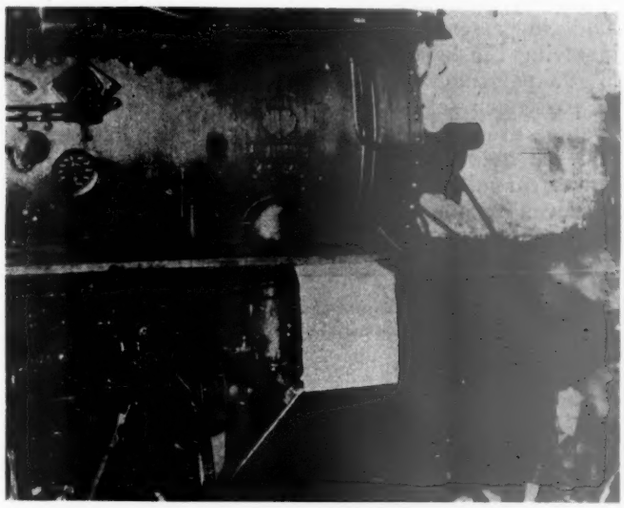
On August 2, 1930, while handling Pennsylvania train No. 13, westbound between Harrisburg, Pa., and Columbus, Ohio, the locomotive handled 12 cars unassisted up the east slope of the Allegheny mountains where the profile shows maximum grades of 1.9 per cent, compensated; and maximum curvatures of 9 deg. 15 min.

On August 26, 1930, the locomotive handled Pennsylvania train No. 52 (The New Yorker), eastbound between Chicago and Crestline, Ohio. Between the two points mentioned the time table schedule calls for 5 hr. 30 min. running time over a distance of 280 miles. There are also 11 station stops. The total delays on this trip, exclusive of station stops, were 30 minutes and the run was made in 274 minutes running time at an average speed of 61.0 miles per hour. No bad curves or grades are encountered in this district.

While the locomotive was assigned to service on the Pennsylvania, it was moved to Atlantic City in June, 1930, where it was exhibited on Pennsylvania tracks for several days at the convention of the American Railway Association, Mechanical Division.

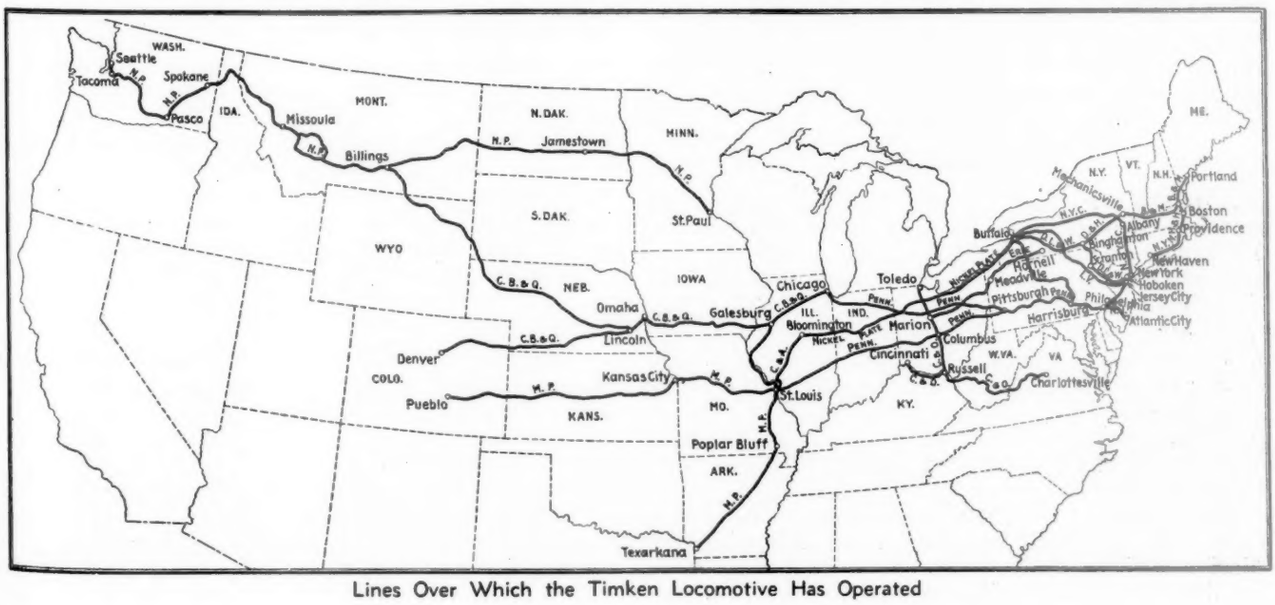
Chesapeake & Ohio

The service of the Timken locomotive on the Chesapeake & Ohio involved eight runs in freight service and 20 runs in passenger service from September 27, 1930, to October 31, 1930. In freight service the total freight mileage was 930, the total cars handled, 984



Test Equipment on the Front End of the Timken Locomotive

and the total tons handled, 53,946. The total car mileage was 117,925 and the total gross ton-miles was 6,291,116. The average gross ton-miles per train-hour on the C. & O. was 135,649 and the average train speed 24.78 miles per hour. The coal consumption in freight service was 36.37 lb. per thousand gross ton-miles and the average evaporation 7.10 lb. Most of the freight runs were made in the river grade territory on the C. & O. between Russell, Ky., and Cincinnati, Ohio,



Lines Over Which the Timken Locomotive Has Operated

and during the eight runs made in freight service trains were handled with maximum tonnages as high as 10,219. Such a run on October 22, 1930, was made between Russell and Cincinnati with a total tonnage, including the locomotive, of 10,219. Over a river-grade territory 384 miles long the train made the run with an average speed of 25.9 miles per hour. On this trip 18 tons of coal and 28,785 gallons of water were used. The average fuel consumption per thousand gross ton-miles was 28.09, including the locomotive; the average evaporation was 7.14 lb. of water per lb. of coal and the gross ton-miles per train-hour, excluding the locomotive, were 212,483.

Passenger Service

Twenty runs, involving a total of 7,128 miles, were made in passenger service on the Chesapeake & Ohio, involving the handling of 177 cars, making a total of 57,795 passenger car-miles. The average train speed in passenger service was 38.73 miles per hour; the average evaporation 8.00 lb. of water per lb. of coal; and the average coal consumption 9.68 lb. per passenger car-mile.

Eleven of the trips on the C. & O. were on that road's de luxe train, "The Sportsman," operating between Detroit, Mich., and Clifton Forge, Va., a distance of 552 miles. On October 9, 1930, the Timken locomotive handled this train, southbound, between these two points and was able to make up total delays of 81 minutes while handling nine cars. The average speed for the trip was 41.5 miles per hour.

Table I—Service Record of the Timken Roller Bearing Locomotive No. 1111

From	To	Railroad	Freight mileage	Passenger mileage	Total mileage	Accumulated mileage
Apr. 14, 1930	May 21, 1930	N. Y. C.	6,582	none	6,582	6,582
June 8, 1930	Sept. 24, 1930	Penn.	10,667	7,871	18,538	25,120
Sept. 27, 1930	Oct. 31, 1930	C. & O.	930	7,128	8,058	33,178
Nov. 1, 1930	Dec. 1, 1930	Erie	2,922	3,058	5,980	39,158
Dec. 1, 1930	Dec. 26, 1930	N. Y. N. H. & H.	3,007	360	3,367	42,525
Jan. 1, 1931	Feb. 7, 1931	B. & M.	4,193	none	4,193	46,718
Feb. 11, 1931		D. & H.	148†	none	.....	.....
Feb. 22, 1931	Apr. 8, 1931	D. L. & W.	834	15,140	15,974	62,692
Apr. 19, 1931	June 30, 1931	L. V.	5,535	3,017	8,552	71,244
July 1, 1931	July 11, 1931	N.Y.C.&St.L.	2,110	none	2,110	73,354
July 16, 1931	July 17, 1931	C. & A.	158	none	158	73,516
Aug. 1, 1931	Sept. 20, 1931	Mo. Pac.	3,921	3,448	7,369	80,885
Sept. 21, 1931	Oct. 27, 1931	C. B. & Q.	7,137	970	8,107	88,992
Oct. 28, 1931	Jan. 4, 1932*	Nor. Pac.	3,659	7,672	11,331	100,319
		Total Mileage	51,655	48,664	100,319	

* Service on the Northern Pacific not yet completed.
† Light movement between two roads; mileage included in other totals.
Revised January 31, 1932

A total of 56 runs in both passenger and freight service was made on the Erie between November 1, 1930, and December 1, 1930. During this time the locomotive made a total freight mileage of 2,922, handled 2,003 cars and a total tonnage of 78,356. The car-mileage totaled 192,194 and the gross ton-mileage was 7,918,626. The average train speed in freight service on the Erie was 27.12 miles per hour, and the gross ton-miles per train-hour, 54,070. The average coal consumption was 71.91 lb. per thousand gross ton-miles including the locomotive and the average evaporation was 7.41 lb.

On November 14, 1930, the locomotive handled a train of 69 cars, 3,052 tons, over the main line between Marion, Ohio, and Meadville, Pa., at an average speed for the trip of 30.83 miles per hour. The gross ton-miles per train-hour on this trip was 59,411 and the evaporation 7.37 lb. of water per lb. of coal.

Passenger Service

A total of 28 runs was made in passenger service on the Erie, involving 3,058 miles, 275 cars and 27,934 passenger car-miles. The average train speed for all runs on the Erie was 41.56 miles per hour. The average coal consumption was 11.43 lb. per passenger car-mile and the average evaporation, 8.20 lb.

On November 27, 1930, the Timken locomotive, handling train No. 2, the "Erie Limited," westbound, between Hornell, N. Y. and Salamanca, N. Y., left Salamanca 20 minutes late and, in a distance of 82 miles between the above mentioned points, made up all of the lost time and arrived in Hornell five minutes ahead of the scheduled time. The average speed on this trip, hauling seven cars, was 58.8 miles per hour and the run was made over a territory involving maximum grades of one per cent and three degree curves.

New York, New Haven & Hartford

Between December 1, 1930, and December 26, 1930, a total of 21 runs was made in both passenger and freight service on the New Haven. In freight service, 19 runs, involving 3,007 miles, were made. On these runs a total of 2,042 cars and 73,030 tons were handled. The total car-mileage was 269,992 and the total gross ton-miles, 10,719,755. The gross ton-miles per train-hour for all of the runs on the New Haven was 46,686. The coal consumption per thousand gross ton-miles was 58.49 and the evaporation, 7.56 lb. The average train speed for all runs was 22.99 miles per hour.

On December 11, 1930, between New Haven and Boston, the locomotive handled a train of 151 cars, 7,371 tons, at an average speed of 16.5 miles per hour. The gross ton-miles per train-hour on this trip was 61,945, and the evaporation, 7.91 lb.

Passenger Service

In passenger service two runs, one east and one west, were made on the "Merchants' Limited" between New Haven and Boston, involving a total of 360 train-miles and the handling of 28 cars. On the eastbound run of this train on December 24, 1930, the locomotive covered the 180 miles between the two points mentioned at an average speed of 48.01 miles per hour while handling 14 cars. The run was made in 196 minutes. This train was the first all-roller-bearing train to be operated in this country and for that reason this run is of special interest. All of the bearings on the locomotive, tender and the 14 cars in the train were equipped with roller bearings. On this particular run the scheduled time was maintained until the train was delayed by a block 16 miles west of New Haven. The coal consumption per passenger car-mile on this run was 6.82 lb. and the evaporation was 8.63 lb. of water per lb. of coal.

Boston & Maine

Thirty-five runs were made in freight service between Portland, Maine, and Boston and Worcester, Mass. A total of 4,193 miles was covered, handling 2,813 cars, a total of 310,385 car-miles and 13,338,313 gross ton-miles.

The train performance was at an average rate of 74,668 gross ton-miles per train-hour and at an average train speed of 28.79 miles per hour. The average coal consumption was 51.95 lb. per thousand gross ton-miles with a water rate of 7.39 lb. of water per lb. of coal.

Table II—Summary of All Runs in Passenger Service

Road	Pennsylvania	Chesapeake & Ohio	Erie	New York, New Haven & Hartford	Delaware, Lackawanna & Western	Lehigh Valley	Missouri Pacific	Chicago, Burlington & Quincy	Northern Pacific	Totals and averages
No. runs	23	20	28	2	109	11	14	3	17	227
Average running speed, m.p.h.	45.89	38.73	41.56	48.01	39.39	54.83	41.88	45.16	40.34	41.23
Locomotive-miles ..... Trip	342	339	105	180	138.9	258.1	253	323	451	214
Locomotive-miles ..... Total	7,871	7,128	3,058	360	15,140	3,017	3,448	970	7,672	48,664
Train-miles ..... Trip	341	343	98.5	180	136.7	253.5	243	322	447	209
Train-miles ..... Total	7,846	6,872	2,760	360	14,901	2,788.6	3,403.5	967	7,606	47,505
Number of cars ..... Trip	12.5	8.8	9.8	14	10	11.5	14.5	13.3	10	10.7
Number of cars ..... Total	289	177	275	28	1,121	127	204	40	170	2,431
Coal, tons ..... Trip	16	14	5.7	7.5	8.7	12.7	15.7	20.5	33	11.9
Coal, tons ..... Total	370	283.5	160.5	15	952	139.5	219.25	61.5	462.9	2,664.2
Water, gal. ..... Trip	31,651	26,891	11,218	15,550	13,500.6	22,707	24,180	31,100	38,182	19,190
Water, gal. ..... Total	727,993	537,830	314,120	31,100	1,471,567	249,776	338,515	93,300	534,537	4,298,738
Car-miles ..... Trip	4,119	2,890	997	2,198	1,384.8	2,887	3,328	4,135	3,703	2,135
Car-miles ..... Total	94,744	57,795	27,934	4,396	150,945	31,757	46,586	12,405	51,845	478,407
Average lb. coal per car-mile	7.77	9.68	11.43	6.82	12.57	8.78	9.41	9.91	17.85	11.13
Running time, hours.. Trip	7.43	8.88	2.37	3.20	3.47	4.63	5.71	7.13	8.65	4.79
Running time, hours.. Total	170.92	177.62	66.55	6.40	379.18	51.00	79.91	21.39	121.23	1,074 2
Train-hours ..... Trip	8.61	9.57	.....	3.56	3.78	.....	6.42	8.45	10.64	4.79
Train-hours ..... Total	198.10	191.53	.....	7.13	412.59	.....	89.95	25.37	149.02	1,073.69
Average lb. water per lb. coal	8.24	8.00	8.20	8.63	6.46	7.46	6.43	6.32	4.81	6.72

Atmospheric temperatures during the test in freight service on the Boston & Maine varied from 20 degrees below zero to 24 degrees above zero.

One particular run is of interest. On January 24, 1931, with a temperature of 20 degrees below zero, the locomotive covered a distance of 112 miles, handling a train of 86 cars, 3,040 tons, in 194 minutes running time at an average speed for the entire distance of 33.74 miles per hour. The train performance on this run was at a rate of 76,016 gross ton-miles per train-hour and the evaporation, 7.10 lb. of water per lb. of coal.

Delaware & Hudson

A light run of 148 miles was made over the Delaware & Hudson between Mechanicsville, N. Y., and Binghamton, N. Y., where the locomotive was turned over to the Delaware, Lackawanna & Western for service on that road.

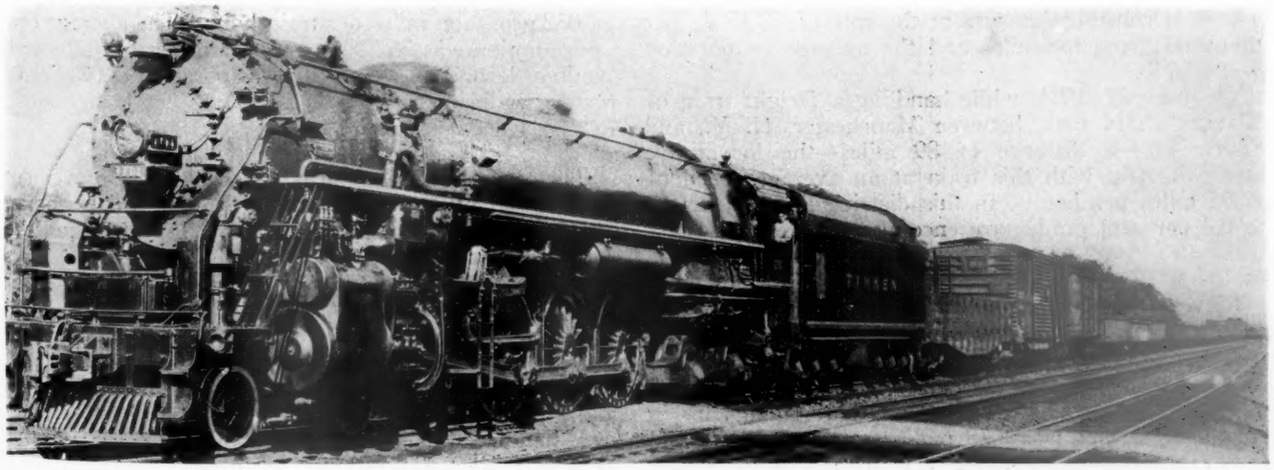
Delaware, Lackawanna & Western

Only 834 miles of freight service were operated on the Lackawanna, most of this running light or in helper service.

Passenger Service

The Timken locomotive made more runs in passenger service on the Lackawanna than on any other one road to date. A total of 109 runs, involving 15,140 miles, was made between February 22, 1931, and April 8, 1931. The total number of cars handled was 1,121 and the total passenger car-mileage was 150,945. The average train speed for all runs on the Lackawanna was 39.39. The coal consumption was 12.57 lb. per passenger car-mile and average evaporation was 6.46 lb. All of the runs on the Lackawanna were between Hoboken, N. J., and Scranton, Pa. In this district, grades of from 1.50 to 1.70 per cent and curves up to six degrees are encountered in the district over the Pocono mountains. A total of 28 runs, both east and west, was made between Scranton and Hoboken on the "Lackawanna Limited."

One particular run on the Lackawanna is of interest. On March 11, 1931, while handling train No. 12, the Timken locomotive left Scranton 56 minutes late, with a train of 11 cars. The rail was wet and slippery with snow falling. The train had a helper locomotive from Scranton to Lehigh Summit, a distance of 18.5 miles. Over this district a six-mile grade of 1.67 per cent, compensated, and 12 miles of 1.21 per cent are encountered. The train ran from Scranton to Gouldsboro, Pa., a distance of 20.3 miles, in 33 minutes at an average speed of 37 miles per hour, making up 13 minutes on the mountain. Another 13-minute delay was encountered at Stroudsburg, Pa. Between Strouds-



Timken Locomotive Hauling a Heavy Freight Train on the Pennsylvania

burg and Summit, N. J. the rest of the lost time was made up—the train being on time at Summit, N. J.—which is 21 miles out of the terminal at Hoboken, N. J., 69 minutes of lost time having been made up in 113 miles of running. This run was made with nine tons of coal and 12,767 gallons of water. The average evaporation was 5.91 and the coal consumption per passenger car-mile was 12.61.

Lehigh Valley

A total of 61 runs was made in both freight and passenger services on the Lehigh Valley. In freight service 50 runs, totaling 5,535 miles were made. The total number of cars handled, 3,981 and the total tonnage, 152,730. The total freight car-mileage on the Lehigh Valley was 347,274 and a total of 14,600,799 gross ton-miles was made. The train performance was at 78,678 gross ton-miles per train-hour and the average speed for all freight runs was 36.93 miles per hour. The coal consumption was at the rate of 68.35 lb. per thousand gross ton-miles and the average evaporation was 6.50 lb.

On June 22, 1931, while handling a freight train of 57 cars, 2,314 tons, between Manchester, N. Y., and Sayre, Pa.—a distance of 89 miles—the locomotive made the trip with this train at an average speed of 47.05 miles per hour. In this district 42 miles of 0.3 to 0.4 per cent grades are encountered.

Passenger Service

Eleven trips, totaling 3,017 miles, were made in passenger service. A total of 127 cars was handled, making a total of 31,757 passenger car-miles. The average train speed for all passenger runs was 54.83 miles per hour. The coal consumption for all trips in passenger service was 8.78 per passenger car-mile and the evaporation was 7.46 lb. of water per lb. of coal.

On May 25, 1931, while handling train No. 6, the "Lehigh Limited" from Buffalo, N. Y. to Coxton, Pa.—a distance of 266 miles—maximum speeds of 75 miles per hour were reached over a 42-mile grade of 0.2 per cent between Geneva Junction and Hinman, N. Y. The average speed for this run was 58.3 miles per hour. The coal consumption was 9.95 lb. per passenger car-mile and the evaporation, 7.69 lb. of water per lb. of coal.

New York, Chicago & St. Louis

Twelve runs in freight service were made on the Nickel Plate between Buffalo, N. Y., and Bellevue, Ohio, and between Lima, Ohio, and Tipton, Ind., totaling 2,110 miles. The total number of cars handled and the total tonnage handled were 913 and 35,374 respectively. The car mileage was 181,690 and the gross ton-miles, including locomotive, 6,387,031. The average train speed for all freight runs was 31.7 miles per hour and train performance was at an average rate of 61,032 gross ton-miles per train-hour. The average coal consumption was 76.21 lb. per 1,000 gross ton-miles, including locomotive, and the evaporation 7.02 lb. of water per lb. of coal.

Chicago & Alton

The service on this road involved only one movement of 125 cars over a distance of 158 miles which was an inter-road movement between the Nickel Plate and the Missouri Pacific.

Missouri Pacific

During the 50 days that the Timken locomotive was on the Missouri Pacific 14 passenger runs and 15 freight runs were made. The freight runs covered 3,921 miles and a total of 1,198 cars were handled. The total tonnage handled was 48,611; the car-miles 265,155 and the gross ton-miles, 11,536,351. Train performance was at an average rate of 73,424 gross ton-miles per train-hour.

Table III—Summary of All Runs in Freight Service

Road*	New York Central	Pennsylvania	Chesapeake & Ohio	Erie	New York, New Haven & Hartford	Boston & Maine	Lehigh Valley	New York, Chicago & St. Louis	Missouri Pacific	Chicago, Burlington & Quincy	Northern Pacific	Totals and averages
No. runs	44	45	8	28	19	35	50	12	15	50	22	328
Average running speed, m.p.h.	28.26	29.64	24.78	27.12	22.99	28.79	36.93	31.70	33.64	34.27	28.0	29.80
Locomotive-miles {Trip	149.5	237.0	117.0	104.3	158.0	120.0	92.0	175.8	261.4	123.0	122.0	152.0
Locomotive-miles {Total	6,582	10,667	930	2,922	3,007	4,193	5,535	2,110	3,921	7,137	3,659	51,655
Train-miles {Trip	146.7	220.0	114.0	102.0	149.0	110.0	89.9	174.1	232.8	122.0	110.1	126.9
Train-miles {Total	6,458	9,911	915	2,856	2,836	3,856	4,495	2,090	3,493	6,094.8	2,422.08	45,427
No. of cars {Trip	103.6	101.0	123	71.5	107.4	80.3	79.8	76.0	79.8	77.8	60.0	83.4
No. of cars {Total	4,561	4,558	984	2,003	2,042	2,813	3,981	913	1,198	3,893	1,323	27,356
Tons per trip {Excl. loco.	3,500	3,999	6,391	2,411	3,507	3,067	2,755	2,592	2,885.7	2,828	2,679	3,160
Tons per trip {Incl. loco.	3,860	4,354	6,743	2,798	3,844	3,417	3,054	2,947	3,240.7	3,246	3,034	3,516
Total tons {Excl. loco.	154,130	179,962	51,126	67,506	66,640	107,354	137,764	31,114	43,286	138,577	58,934	1,036,393
Total tons {Incl. loco.	169,840	195,937	53,946	78,356	73,030	119,611	152,730	35,374	48,611	159,078	66,744	1,153,257
Coal, tons {Trip	13.8	22.4	14.3	11.3	16.5	9.9	9.2	17.3	23.9	13.8	15.0	14.56
Coal, tons {Total	608	1,009	115	316	315	347.5	460.5	227.3	358.2	689.75	330.75	4,777
Water, gal. {Trip	22,788	39,596	24,380	20,083	29,966	17,580	14,365	31,964	38,014	20,592	18,294	23,874
Water, gal. {Total	1,002,660	1,781,820	195,038	562,334	569,362	615,294	718,256	383,570	570,220	1,029,640	402,461	7,830,656
Car-miles {Trip	14,381	20,696	14,741	6,864	14,200	8,868	6,945	15,141	17,677	8,872	6,590	11,699
Car-miles {Total	632,753	931,342	117,925	192,194	269,992	310,385	347,274	181,690	265,155	443,634	144,987	3,837,331
G.t.m. per trip {Excl. loco.	514,486	807,185	746,069	246,559	512,683	341,984	238,224	470,401	710,087	324,464	283,355	440,321
G.t.m. per trip {Incl. loco.	566,865	886,896	786,390	282,808	564,198	381,095	269,479	594,865	795,610	374,193	322,438	491,077
G.t.m. total {Excl. loco.	22,637,383	36,323,360	5,968,551	6,903,645	9,740,975	11,969,434	12,808,527	5,644,821	10,296,268	15,898,743	6,233,826	144,425,533
G.t.m. total {Incl. loco.	24,942,033	39,910,360	6,291,116	7,918,626	10,719,755	13,338,313	14,600,799	6,387,031	11,536,351	18,335,466	7,093,662	161,073,512
Aver. lb. coal per 1,000 g.t.m. {Excl. loco.	53.64	55.50	38.33	91.66	64.36	57.89	77.32	88.43	69.57	86.76	106.11	66.15
Aver. lb. coal per 1,000 g.t.m. {Incl. loco.	48.68	50.51	36.37	71.91	58.49	51.95	68.35	76.21	62.09	75.23	93.25	59.31
Running time, hours {Trip	5.19	7.42	4.60	3.76	6.48	3.82	2.52	5.68	6.92	3.56	3.93	4.65
Running time, hours {Total	228.39	334.20	36.76	105.26	123.19	133.93	126.09	68.19	103.78	177.97	86.48	1,524.2
Train-hours {Trip	6.52	10.08	5.50	4.56	10.94	4.58	3.08	7.97	9.34	4.43	5.28	6.12
Train-hours {Total	286.80	453.60	43.98	127.60	207.87	160.28	154.39	95.65	140.23	221.86	116.15	2,008.4
Gross ton-miles per train-hour	78,931	80,078	135,649	54,070	46,686	74,668	78,678	61,032	73,424	71,661	53,670	71,911
Evaporation, lb. water per lb. of coal	6.88	7.36	7.10	7.41	7.56	7.39	6.50	7.02	6.63	6.22	5.07	6.83

* The Delaware, Lackawanna & Western, with 834 locomotive-miles, and the Chicago & Alton with 158 locomotive-miles in freight service, are omitted from the table, as performance details are not available. The mileages, however, are included in the total.

The coal consumption was 62.09 lb. per 1,000 gross ton-miles and the average evaporation for all freight runs was 6.63 lb.

Passenger Service

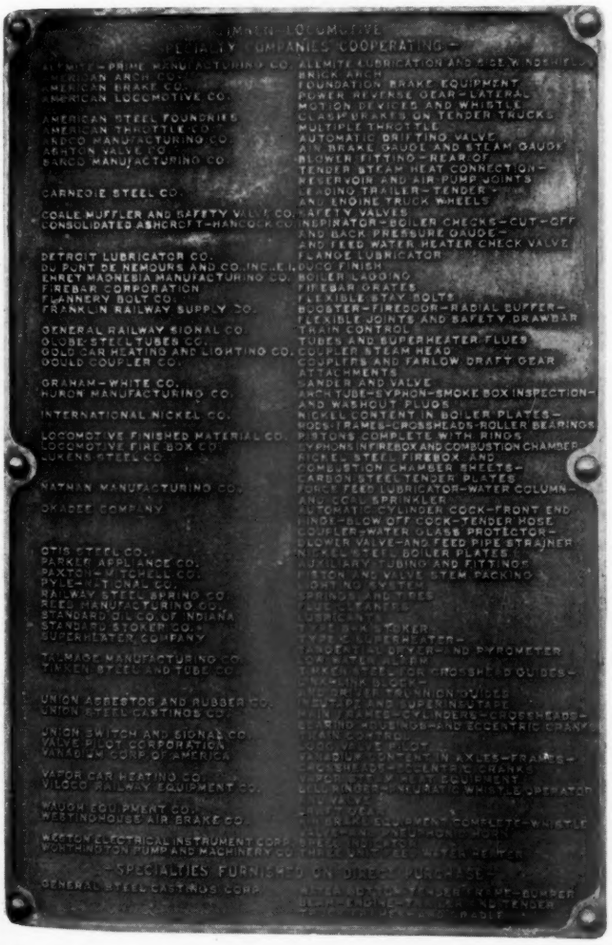
A total of 3,448 miles was covered during the 14 runs in passenger service on the Missouri Pacific. The total number of cars handled was 204 and the passenger car-mileage was 46,586. The average train speed was 41.88 miles per hour. Coal consumption averaged 9.41 lb. per passenger car-mile and the evaporation averaged 6.43 lb.

On September 4, 1931, while handling the "Hot Springs Special" between St. Louis and Poplar Bluff, Mo., the locomotive hauled 18 cars up a 1.75 to 2.0 per cent grade, four miles long and went over the top at a speed of 21 miles per hour. This was an unusually heavy train on account of Labor Day traffic. The average speed for the trip of 170 miles was 43.35 miles per hour.

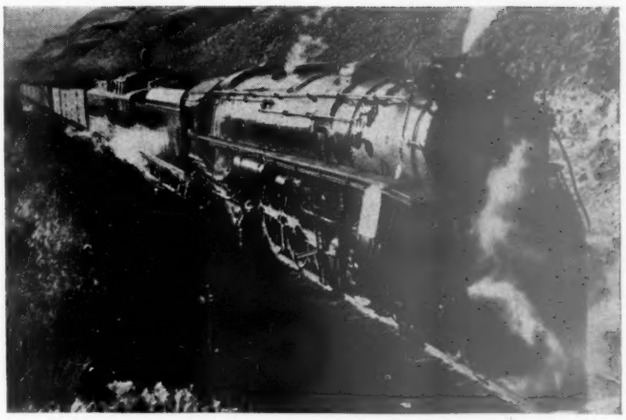
Chicago, Burlington & Quincy

Between September 21, 1931, and October 27, 1931, a total of 53 runs was made on the Burlington, 50 in freight service and three in passenger. During the freight runs a total of 7,137 miles were covered and 3,893 cars handled. The total tonnage moved was 159,078 and the car-mileage totaled 443,634. Train performance averaged 71,661 gross ton-miles per train-hour and the average train speed was 34.27 miles per hour. Coal consumption averaged 75.23 lb. per 1,000 gross ton-miles and the evaporation averaged 6.22 lb.

On October 5, 1931, the locomotive handled a train


MAIN LOCOMOTIVE
SPECIALTY COMPANIES COOPERATING
ALLMITE—PRIME MANUFACTURING CO.
ALLMITE LUBRICATION AND SEWALL SOCKET
AMERICAN BRAKE CO.
FOUNDATION BRAKE EQUIPMENT
AMERICAN LOCOMOTIVE CO.
POWER REVERSE GEAR—LATERAL MOTION DEVICES AND WHISTLE
AMERICAN STEEL FOUNDRIES
CLASP BRAKES ON TENDER TRUCKS
AMERICAN THROTTLE CO.
MULTIPLE THROTTLE
ARCO MANUFACTURING CO.
AUTOMATIC DRIFTING VALVE
ASHTON VALVE CO.
AIR BRAKE GAUGE AND STEAM GAUGE
ARCO MANUFACTURING CO.
BLOWN FITTING—REAR OF TENDER STEAM HEAT CONNECTION—RESERVOIR AND AIR PUMP JOINTS
CARNEGIE STEEL CO.
LEADING TRAILER—TENDER AND ENGINE TRUCK WHEELS
COALE MUFFLER AND SAFETY VALVE CO.
SAFETY VALVES
CONSOLIDATED ASHCROFT-HANCOCK CO.
INSPIRATOR—BOILER CHECKS—CUT-OFF AND BACK PRESSURE GAUGE—FEED WATER HEATER CHECK VALVE
DETROIT LUBRICATOR CO.
FLANGE LUBRICATOR
DU PONT DE NEMOURS AND CO., INC., E. I.
DUCO FINISH
EMRET MAGNESIA MANUFACTURING CO.
BOILER LAGGING
FIREBAR CORPORATION
FIREBAR GRATES
FLANNERY BOLT CO.
FLEXIBLE STAY BOLTS
FRANKLIN RAILWAY SUPPLY CO.
BOOSTER—FIREDOOR—RADIAL BUFFER—FLEXIBLE JOINTS AND SAFETY DRAWBAR
GENERAL RAILWAY SIGNAL CO.
TRAIN CONTROL
GLOBE STEEL TUBES CO.
TUBES AND SUPERHEATER FLUES
GOLD CAR HEATING AND LIGHTING CO.
COUPLER STEAM HEAD
GOULD COUPLER CO.
COUPLERS AND FARLOW DRAFT GEAR ATTACHMENTS
GRAHAM-WHITE CO.
SANDER AND VALVE
HURON MANUFACTURING CO.
ARCH TUBE—SYPHON—SMOKE BOX INSPECTION—AND WASHOUT PLUGS
INTERNATIONAL NICKEL CO.
NICKEL CONTENT IN BOILER PLATES—BOXES, FRAMES—CROSSHEADS—ROLLER BEARINGS
LOCOMOTIVE FINISHED MATERIAL CO.
PISTONS COMPLETE WITH RINGS
LOCOMOTIVE FIRE BOX CO.
SYPHONS IN FIREBOX AND COMBUSTION CHAMBER
LUKENS STEEL CO.
NICKEL STEEL FIREBOX AND COMBUSTION CHAMBER SHEETS—CARBON STEEL TENDER PLATES
NATHAN MANUFACTURING CO.
FORCE FEED LUBRICATOR—WATER COLUMN—AND CORK SPRINKLER
OKADEE COMPANY
AUTOMATIC CYLINDER COCK—FRONT END HINGE—BLOW OFF COCK—TENDER HOSE COUPLER—WATER GLASS PROTECTOR—BLOWER VALVE—AND FEED PIPE STRAINER
OTIS STEEL CO.
BOILER PLATES
PARKER APPLIANCE CO.
AUXILIARY TUBING AND FITTINGS
PAXTON-MITCHELL CO.
PISTON AND VALVE STEM PACKING
PYLE-NATIONAL CO.
LIGHTING SYSTEM
RAILWAY STEEL SPRING CO.
SPRINGS AND SPRING PLATES
REED MANUFACTURING CO.
SAFETY APPLIANCES
STANDARD OIL CO. OF INDIANA
LUBRICANTS
STANDARD STOKER CO.
TYPE E-1 STOKER
SUPERHEATER COMPANY
TYPE E SUPERHEATER—PYROMETER AND PYROMETER TUBE
TALMADGE MANUFACTURING CO.
CAB WATER SCREEN
TIMKEN STEEL AND TUBE CO.
TIMKEN STEEL FOR CROSSHEAD GUIDES—LINK—LINK BLOCKS
UNION ASBESTOS AND RUBBER CO.
PISTON AND UNION PACKING
UNION STEEL CASTINGS CO.
MEDIUM AND SUPERINTENDENT
UNION SWITCH AND SIGNAL CO.
MAIN FRAMES—CYLINDERS—CROSSHEADS—BEARING HOUSINGS—AND ECCENTRIC CRANKS
VALVE PILOT CORPORATION
VANADIUM CORP. OF AMERICA
VANADIUM CONTENT IN AXLES—FRAMES—CROSSHEADS—ECCENTRIC CRANKS
VAPOR CAR HEATING CO.
STEAM HEATING EQUIPMENT
VILCO RAILWAY EQUIPMENT CO.
CYLINDER—VALVE—AND VALVE OPERATOR
WAUGH EQUIPMENT CO.
WASHINGTON VALVE
WESTINGHOUSE AIR BRAKE CO.
AIR BRAKE EQUIPMENT—COMPLETE—WHISTLE
WESTON ELECTRICAL INSTRUMENT CORP.
WORTHINGTON PUMP AND MACHINERY CO.
FEED WATER HEATER
SPECIALTIES FURNISHED ON DIRECT PURCHASE
GENERAL STEEL CASTINGS CORP.

Bronze Plate on the Tender Showing the Names of Specialty and Material Manufacturers



Hauling a Freight Train on the Pasco Division of the Northern Pacific

of 122 cars, 6,112 tons, including the locomotive, between Galesburg, Ill. and Ottumwa, Ia., a distance of 117 miles, at an average speed for the trip of 33.3 miles per hour. Train performance on this trip was at the rate of 109,000 gross ton-miles per train-hour.

Passenger Service

The three passenger runs on the Burlington involved 970 miles and 40 cars. The average speed was 45.16 miles per hour and the passenger car-miles 12,405. The coal consumption averaged 9.91 per passenger car-mile and the evaporation averaged 6.32 lb.

On October 19, 1931, while handling train No. 3 from Lincoln to McCook, Neb., a distance of 230 miles, the locomotive hauled 16 cars on schedule time at an average speed of 45.6 miles per hour. The grades in this territory are from 0.3 to 0.6 per cent.

Northern Pacific

The Timken locomotive has been in service on the Northern Pacific since the last of October, 1931, and from that time to January 4, 1932, made 22 freight runs and 17 passenger runs. The freight runs totaled 3,659 miles and 1,323 cars. The total tonnage was 66,744 and the freight car-miles 144,987. A total of 7,093,662 gross ton-miles was made. The average freight-train speed for the 22 runs is 28.00 miles per hour and train performance is at the rate of 53,670 gross ton-miles per train-hour. Coal consumption averaged 93.25 lb. per 1,000 gross ton-miles and the average evaporation was 5.07 lb.

Passenger Service

Seventeen runs have been made in passenger service on the Northern Pacific covering a total of 7,672 miles and the handling of 170 cars. The total passenger car-mileage was 51,845 and the average train speed, 40.34 miles per hour. The coal consumption in passenger service has averaged 17.85 lb. per passenger car-mile and the evaporation 4.81 lb.

While handling train No. 2 between Missoula, Mont., and Jamestown, N. D., a distance of 906 miles, the locomotive made the run in 25 min. less than the schedule time for the district. On another run between Jamestown and St. Paul—346 miles—a distance of 45 miles was made in 47 minutes, hauling 10 cars up a 0.4 per cent grade. On this trip the train left Jamestown 57 min. late and arrived at St. Paul on time. An average speed of 50 miles per hour was made in the course of this run.

Principal Features of Design*

The engine-truck and tender-truck roller bearings on the Timken locomotive are of a type that have been developed as a result of over four years of experience in locomotive service. In some cases, on locomotives equipped with these bearings on the engine trucks only, the service mileages are up in the neighborhood of 500,000.

The driving-wheel bearings on this locomotive are of a type having a single row of rolls adjacent to each wheel. Both bearings are mounted in a one-piece housing extending across the frame, the axle unit thus comprises the axle and wheels, bearings and housing, assuring the absolute maintenance of alinement between these

Table IV—Performance of Main- and Side-Rod Bushings

	Back-end main		Main side rod		Front wheel		Back inter.		Back wheel	
Mileage	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left
146	....	....	....	....	....	....	....	....	(1)	....
1,462	(2)	....	....	....	....	....	....	....	....	....
2,192	....	....	....	....	(1)	....	....	....	....	....
6,582	....	....	....	....	(4)	(4)	(4)	(4)	(4)	(4)
42,010	....	....	....	(3)	....	....	....	....	....	....
64,653	(3)	(3)	(3)	....	....	(3)	(3)	....	....	....
64,740	(5)	....	(5)	....	....	....	....	....	....	....
65,658	(6)	....	....	....	....	....	....	....	....	....
69,029	(6)	....	....	....	....	....	....	....	....	....
69,129	....	....	(6)	....	(7)	(7)	(7)	(3)	(7)	(9)
69,651	....	....	....	....	(7)	....	(7)	....	....	....
73,416	(7)	....	....	....	....	....	....	....	....	....
73,526	....	....	....	....	(7)	....	....	....	....	....
80,146	....	....	(8)	(10)	(8)	(10)	(8)	....	....	....
82,139	....	....	....	(6)	....	....	....	....	....	....
83,145	....	(6)	....	....	....	(6)	....	....	....	....
100,319	Record ended; all bushings still in service.									

Maximum mileages for any one bushing application:
63191 64653 64653 42010 62547 58071 58071 62547 62547 62547

Reasons for Renewing Rod Bushings at Mileages Indicated Above
(1) Not enough lateral
(2) Not enough diameter clearance
(3) Diameter wear
(4) Changed from fixed to floating bushing
(5) Experimental Construction
(6) Defective casting
(7) Bushing cracked
(8) Main crank pin broke
(9) Bushing broken
(10) Damage as result of right main pin breaking

respective parts, irrespective of the condition of the rails and the oscillation of the locomotive frame. Inasmuch as the application of roller bearings to driving wheels demands the maintenance of a high degree of accuracy as regards axle tramming and side-rod spacing the use of adjustable features such as used in plain-bearing locomotives is precluded. This necessitated a radical departure from the conventional in the design of the pedestal arrangement.

An underlying fact controlling this design is the wide discrepancy between the capacity of the roller bearings on the axles and the plain bearings on the crank pins involving a condition whereby the wheels being off tram would impose destructive extraneous loads on the wheel and rod bearings. In designing this locomotive no fear was felt for the roller bearings on the axles but rod bearings lack the capacity to stand extraneous loads of this nature. The traditional shoe and wedge construction could be built accurately to close measurements as far as tram is concerned. The adjustment of wedges, over a period of years, however, might lead ultimately to off-tram conditions. It was therefore considered advisable to construct the pedestal faces with parallel sides and line the bearing housings with hardened-steel liners which contact directly with the hardened-steel trunnion guides. The pedestal liners are steel—the complete construction comprising a hardened-steel mechanism which takes the reactions of the piston thrust.

The trunnion guides are hardened channel-shaped forgings and are flexibly mounted on trunnions which are integral with the bearing housing. The trunnion guides are free to pivot on this trunnion and thus maintain a full surface contact with the pedestal liners without the hour-glass machining of the bearing housings. The trunnion-guide construction which is used on the Timken inboard bearing housings on engine trucks and drivers has been in actual service for over four years, and has been or will be applied to over 350 locomotives in operation or on order.

Aside from the application of anti-friction bearings on this locomotive, one of the high spots of its construction is the generous use of nickel-alloy steels throughout its design, there being about 100,000 pounds of this material in it. Among the principal items, aside from the Timken bearings, which contain 5 per cent nickel, are the boiler shell, firebox sheets, combustion-chamber and throat sheets and Thermic syphons all of which contain 2 per cent nickel; the main frames and crossheads; the main rods and side rods, each of which are 2¾ per cent nickel alloy; the cylinder liners and valve bushings which are 1 per cent nickel cast iron, and the trunnion guides with a nickel content of 4 to 5 per cent.

Lateral Motion

The lateral motion device on No. 1 driving wheel is used to facilitate operation on roads with 20-degree curvature. This limits the rigid wheel base to 12 ft. 10 in., whereas the driving wheel base is 19 ft. 3 in. The lateral motion on either side of the neutral axis is against fixed spring resistance and on leaving curves is automatically returned to the neutral axis.

The lateral motion on the leading trailer axle is of the roller inclined-plane type. This serves the two-fold purpose of complying with all I.C.C. regulations concerning uncontrolled lateral motion on locomotive axles and it imposes on the leading trailer axle a certain duty in guiding the locomotive on curves, thereby relieving the rear trailer axle to a corresponding extent. It is quite possible that the exceptionally smooth riding qualities of this locomotive may be traced directly to this definite guidance on all of the wheels. In connection with the general study of relief of excessive strain on entering and leaving curves, the spread of the front and

The Presence of Ice on the Driving-Wheel Hubs and Spokes Adjacent to the Hubs at the End of a Fast Passenger Run Indicates the Low Bearing Temperatures

* A complete description of the Timken Roller Bearing Locomotive was published in the *Railway Age* for May 24, 1930, page 1225 and in the Railway Mechanical Engineer for June 1930, page 316.

back driver tires is made 1/8 in. narrower than the main and back intermediate wheels. Therefore, all the wheels on the locomotive carry their normal proportion of flange thrust reactions on curved track.

Absence of Thrust Plates

There are no thrust plates anywhere on the Timken locomotive. The thrust reactions on the leading truck, driver, trailer and tender are taken directly on the rolling surfaces of the tapered bearing. The taper construction of the bearing takes this thrust reaction without any additional mechanism, and, inasmuch as the thrust is taken on lubricated roller-bearing surfaces the loss is said not to be over one-twentieth of one per cent, or about one pound per ton. The lateral motion that was built into the locomotive is maintained throughout the life of the bearings. In the 100,000 miles which the Timken locomotive has operated to date there has been no appreciable change in this lateral. The net result of this design and construction is the elimination of surging at low, medium and high speeds—the latter term having reference to speeds of 70 to 85 m.p.h.

Super-Elevation

Oil loss is avoided on tracks with high super-elevation in the following manner: The trailer and tender axles have outboard bearings with independent housings for each wheel. The engine-truck and driving-wheel bearings have one-piece housings but the bottom part of the housing is deepened at both ends to provide independent cavities for each bearing. The depth of the oil cavities is sufficient to avoid any loss of oil from one side to another at high super-elevation.

Valve oil is used for the lubrication of all roller bearings. The housings of the various bearings have the following oil capacities for each wheel:

Engine truck	9 pints
Drivers	24½ pints
Leading trailer	10 pints
Rear trailer	16 pints
Tender trucks	9 pints

In 21 months of service a total of 1,125 pints of lubricant has been used on the various roller bearings. Of this total 104 pints have been lubricant that has been added from time to time, the remaining 1,021 pints having been involved in complete oil changes. Table V shows the amounts added and the details of oil changes on the several roads over which the locomotive operated during the period mentioned. Reference to Table V will give an idea of the mileages obtained between oil changes.

The Question of Maintenance

As far as the roller bearings on the Timken locomotive are concerned there has been no maintenance during 100,319 miles of service except that of the normal inspection and lubrication. In spite of the fact that the driving wheel bearings receive the identical piston thrust to that taken by the rod bearings multiplied by the leverage due to the overhang of the crank pins over the wheel bearings and, in addition, carry their proportionate weight of the locomotive on drivers, the original roller bearings after 100,000 miles of service are in excellent condition. No repairs have been made during that term of service. Aside from lubrication inspection and servicing no adjustments of any bearing have been necessary except on the main drivers. In this case it was found that one of the bearing cups (the outer roller raceway) had seated itself into the bearing housing which necessitated pressing on one of the driving wheel centers 1/32 in. This bearing shows no indications of wear. The condition which made this seating of the bearing cup in the housing possible has been corrected in subsequent designs.

It was expected that the pedestal liners would show some wear. That which has resulted after 100,000 miles of service is surprisingly small. On the front and back drivers the wear has been negligible. The main and intermediate pedestal liners developed a total of 1/32 in. looseness and the liners have been renewed. Experience so far has indicated that improved lubricating conditions will prolong the life of the pedestal liners and trunnion-guide surfaces.

Experience to date with the Timken locomotive while handling heavy trains on fast schedules has indicated that the rise in temperature of the roller bearings varies from 15 deg. above atmospheric temperature on the front, intermediate and back driving wheels to 30 deg. above atmospheric temperature on the trailer wheels. The main drivers have shown a maximum rise of 20 deg. above atmosphere. These temperatures are contrasted with increases in temperature on the side-rod bearings of from 100 to 350 deg. above atmosphere and on the back-end main-rod bearing of from 200 to 400 deg. Some indication of the actual temperatures at

Table V—Pints of Oil Used on Timken Locomotive

		Bearing Location and Number																										
		Tender												Trailer				Driver								Engine truck			
Railroads	Oil	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Pennsylvania	Added	2	1½	..	..	2	2	..	1½	2	1½	..	1½	..	..	..	..	24½	24½	24½	24½	24½	24½	24½	24½	..	..	..	..
	Changed	9	9	9	9	9	9	9	9	9	9	9	9	26	26	20½	20½	..	..	..	..	..	..	..	..	9	9	9	9
New York Central	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Chesapeake & Ohio	Added	..	..	..	..	..	5	..	..	..	..	..	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Erie	Added	4	9	4	..	4	..	..	..	4	..	9	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Changed	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	24½	24½	24½	24½	24½	24½	24½	24½	..	..	..	..
New York, New Haven & Hartford	Added	4	2	4	3	3	2½	4	2½	3	2½	4	2½	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Boston & Maine	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Delaware, Lackawanna & Western	Changed	9	9	9	9	9	9	9	9	9	9	9	9	26	26	..	..	24½	24½	24½	24½	24½	24½	24½	24½	9	9	9	9
Lehigh Valley	Added	2½	.	2	..	3	..	3	3	..	3	3	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
New York, Chicago & St. Louis	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Chicago & Alton	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Missouri Pacific	Added	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	5	5	..	..	..	..	..	..
Chicago, Burlington & Quincy	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Northern Pacific	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

several of the bearings may be seen in one of the illustrations which shows snow and ice on the bearing housings after a long passenger run on the Northern Pacific.

Performance of Main- and Side-Rod Bushings

When the Timken locomotive was first placed in service there was a decided interest on the part of railroad men in the performance of the main- and side-rod bushings because of the fact that these parts have been the source of much trouble in locomotive operation and maintenance. It was confidently expected by the designers that the application of roller bearings to the driving wheels would have an important influence on the performance of plain bearings on rods. In the first 100,000 miles of service the record seems to indicate that an improvement may be expected as a result of the relative rigidity of construction due to the roller bearings on the driving wheels. The absence of driving-box pounds seems to have had a favorable influence on the rod bushings. The record in Table IV shows the service rendered by the rod bushing.

Shortly after the locomotive was placed in service it was found necessary to change the back-end main-rod bushing, right side; the right front side-rod bushing and the right back side-rod bushing due to their having insufficient lateral in two cases and insufficient diameter clearance in the third instance. At 6,582 miles the fixed bushings on the front, back and intermediate wheels on both sides were removed and replaced by floating type rod bearings. These bearings consisted of a "Timken Steel hardened" liner press-fitted into the rods. A three-piece floating bronze bushing operates between the hardened steel liner and the nickel-steel crank pin. The outside diameters of the floating bushings are crowned and the hardened steel liners reverse crowned to match, the radius being approximately equal to the spacing between the drivers. This creates a self-alining bearing which apparently distributes the load over the entire surface of the crank pin.

After 42,010 miles of service it was necessary to renew the left side-rod bushing at the main pin due to diameter wear. At an accumulated mileage of 64,653, renewals were made for the same reason on both right and left back-end main rod bushings, right side-rod bushing at the main pin, left front side-rod bushing and right intermediate side-rod bushings. At this time the right and left back-end main-rod bushings had given 63,191 and 64,653 miles, respectively, of uninterrupted service. The latter mileage was also obtained from the right side-rod bushing at the main crank pin. At about this period an experimental type plain bearing construction was applied at the main crank pin, right side, on both the main and the side rod. This, however, did not prove satisfactory and was removed after 87 miles of service. During the next 8,800 miles of service defective bushing castings required the renewal of three bearings, cracked bushings required the renewal of eight bearings and a broken bushing made necessary the renewal of one bearing.

When the locomotive had been in service 80,000 miles the right main crank pin ran hot on one trip which was responsible for setting up a fracture that resulted in a broken crank pin. This accident required the renewal of the bushings in the right side rod at the main pin, the front side-rod bushings on both sides and the right intermediate side-rod bushing. During the last 20,000 miles of service defective castings required the renewal of three more bearings.

In spite of the necessity of making rod-bushing changes 38 times during the 21 months the locomotive has been in service, satisfactory mileages for bearing performance have been obtained. One bushing ran 42,000 miles, two more ran 58,000 miles and at the remainder of the bearing locations mileages of 62,000, 63,000 and 64,000 have been obtained. It seems that the roller-bearing driving box construction exerts a favorable influence on rod-bushing performance when it is considered that these mileages exceed present averages on roads having locomotives of similar size.

Influence of the Roller Bearings on Other Factors of Design

Due to the relative absence of vibration and the elimination of shocks due to the pounding of worn driving-box bearings there has been a noticeable absence of loose bolts on this locomotive and because of the fact that there have been no loosened pipe clamps the maintenance of piping has been considerably less than would ordinarily be the case with a plain-bearing locomotive. No loose or broken piping or connections have been experienced thus far.

The use of roller bearings on axles precludes journal wear and the life of the axle is increased considerably, being limited by the minimum wheel-fit diameter. The increased high speeds and bearing pressures on plain bearings, particularly on driving axles, has introduced thermal checking which often leads to ultimate axle failure. In order to eliminate road failures due to this condition it is necessary to make special periodic inspection of the axles as well as replacements. This is expensive.

The absence of thrust plates on all the wheels should eliminate the occurrence of heat-checked wheel hubs. This condition is prevalent on engine-truck wheels and the use of roller bearings obviates this expense of wheel replacement. Furthermore the roller-bearing application permits the use of tender wheels which have a more desirable hub section on the engine truck instead of the usual engine-truck wheel with its heavy section forming a bearing surface.

It may be possible, as a result of this smoother operating mechanism to decrease boiler maintenance.

* * *

Reading Motor Coach Entering Central Union Terminal in New York City

Looking North from Crest of Hump on a Foggy Night

Ohio Central Replaces Yard Only Three Years Old

Retarder-equipped hump to switch 3,000 cars daily included in facilities that were constructed in record time during severe winter weather

By H. F. Schryver

Assistant Engineer, Ohio Central Lines,
Columbus, Ohio

THE Ohio Central has recently completed a major yard project at Stanley, Ohio, six miles south of Toledo. The several groups of tracks south of the Toledo Terminal crossing, including a former flat switching yard which was transformed into a gravity yard, have a capacity of 5,600 cars. An interesting feature of the several stages of this project was the fact that the bulk of the work was done in limited periods under winter conditions of such severity as ordinarily to call for the suspension of construction work of this character. Furthermore the additions and alterations to the yard had to be made in such a way as not to interfere with the operation of existing facilities.

As an indication of the magnitude of the project, the new facility involved the construction or re-arrangement of approximately 67 miles of tracks; the placing of 450,000 cu. yd. of filling material and 200,000 cu. yd. of ballast; the depositing of 10,000 cu. yd. of reinforced concrete and the placing of 440 tons of reinforcing steel in culverts and in the substructure and floor of a viaduct; the construction of a viaduct 1,200 ft. long of sufficient length to span 64 yard tracks, the main-line right of way and a stream which parallels the yard on the west, requiring the erection of 1,230 tons of structural steel; the installation of a car retarder system, a system of power-operated switches and a system of fixed signals and of inductive cab-signal control; the construction of a terminal office building; the relocation and reconstruction of the former office building to provide a Y.M.C.A. for train and engine crews and the construction of other incidental yard, power-supply and water-supply buildings and equipment.

Although the Ohio Central lines of the New York Central had completed the construction of a flat-switching classification yard for northbound and southbound business on the same site in 1926, the continued growth of traffic and the large number of classifications which were required, made it necessary to replace this facility in 1930, only a little more than three years later, with a larger yard designed for gravity switching.

About four miles south of Toledo, the Ohio Central is crossed by the Toledo Terminal. North of this crossing is a storage yard for 3,700 cars which serves, to some extent, as a forwarding yard, so that a northbound forwarding unit was not included as a part of the new-yard design. Extending between Walbridge road, about one-half mile south of the Toledo Terminal crossing, and Crandall road, approximately one mile farther south, the original yard consisted of 26 tracks for the classification of both northbound and southbound traffic.

Northbound traffic consists largely of coal from Southern Ohio, West Virginia and other fields, destined to ports on the upper lakes. The transfer from rail to water is made over the coal docks of the New York Central, which are located on the Maumee river at Toledo. Owing to the continued increase in the volume of coal handled and the large number of classifications which were necessary to separate it into grades, northbound switching required the use of most of this yard, leaving a relatively small track capacity available for southbound classifications. For this reason, additional capacity was required for the southbound movement.

Furthermore, the steady pressure to expedite the

movement of cars through the terminal required more efficient switching facilities than were practicable in a flat-switching yard to handle properly the volume of business that was moving at that time, as well as to provide for further increases. For these reasons, it was decided to replace the existing yard with a yard that was designed to segregate the northbound and southbound traffic and at the same time speed up the classification of the northbound coal and other commodities by provision for gravity switching.

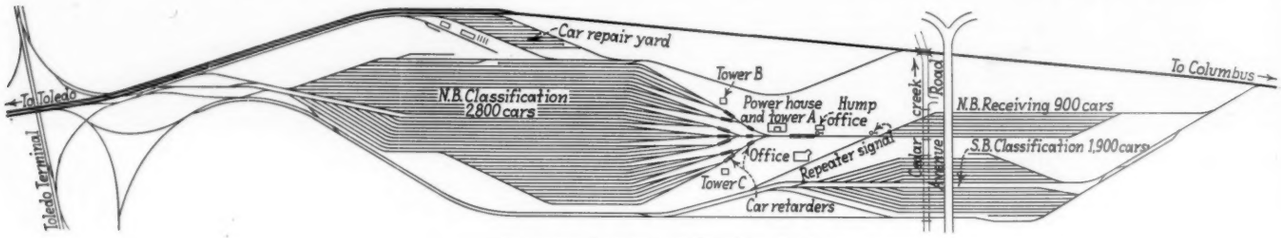


Diagram Layout of Stanley Yard

Although a relatively heavy tonnage is handled through the yard during the winter months, northbound traffic and the incidental classification switching drop sharply with the close of navigation and pick up as sharply when it opens in the spring. It was highly desirable, therefore, to complete as much of the project as practicable during the season of closed navigation in the winter of 1929-1930. For this reason, a contract was awarded in November, 1929, which stipulated that certain parts of the work should be completed early in the spring of 1930 and another contract for additional work was let in October, 1930.

It became apparent at once that a carefully worked-out program of construction would be necessary, every part of which would be scheduled to insure that the specified date of completion would be met, at the same time providing for the orderly and uninterrupted use of the existing facilities. The internal schedule became more important to provide ample time for the installation of such facilities as the car retarders, the power-switch mechanisms and the signal system, since some of these installations could not be started until the tracks were laid or the grading had reached a specified stage.

Based on the plans for the development, the general order of procedure was outlined as follows:

1. The construction of a southbound flat-switching classification yard of 16 tracks with thoroughfare tracks extending north to Walbridge road.
2. The construction of a highway viaduct across the development area, rerouting over it all of the highway traffic that formerly passed over three grade crossings.
3. The re-arrangement of the original 26-track yard and the addition of 16 tracks, transforming this unit into a gravity classification yard for northbound switching by the construction of a hump at Crandall road.
4. The installation of car retarders and power switches at the hump.
5. The construction of a northbound receiving yard of eight tracks, connecting the north lead of this yard with the hump.
6. The installation of a system of fixed signals and of continuous cab-signal control.
7. The construction of a terminal office building at Crandall road, replacing the former office building at Walbridge road, relocating and reconstructing the latter to provide a Y.M.C.A. for train and engine crews.

While these items are listed in the order of their importance and also in the order in which they were to be carried out, it was possible, in several instances, to carry on the construction of several of the units at the same time.

Southbound Yard Designed for Flat Switching

Complete segregation of the northbound and southbound classification switching was contemplated in the plans. Since the southbound classifications are fewer in number and more easily made, the southbound classification yard consists of 16 tracks, holding 1,900 cars, and is designed for flat switching, but has no receiving or forwarding yard.

Work on this unit was started in November, 1929, and completed in five months. Most of the grading and ballasting was done under adverse winter conditions. Practically all of the track work and masonry construction was performed while the temperature remained below freezing.

Avenue Road Viaduct

When the southbound classification yard was nearing completion, construction was started on the Avenue Road viaduct. Previously, highway traffic crossed the area upon which the yard was developed, over three east and west highways, and all of this travel is now routed over the viaduct, which is located approximately on the line of Avenue road, one of the former highways.

View of Hump, Showing Subway and Projecting Corner of Office

Avenue Road viaduct consists of eight through-girder spans, each of which is 111 ft. long, and eight reinforced-concrete flat-slab spans, each 33 ft. in length. The substructure is of reinforced concrete. The driveway is 24 ft. wide between curbs. A three-foot walk is located outside of one of the girders on the through spans and adjacent to the roadway on the flat-slab spans. The approaches are on earth embankments, the material for which was obtained from borrow pits adjacent to the work. The easterly approach is Y-shaped, because the adjoining north-and-south highway with which it connects was too close to permit a straight approach.

Northbound Classification Yard

From the standpoint of the amount of work involved, as well as because of the time limit that it was necessary to put on each of the several items of construction, the northbound classification yard constituted the most important unit of the project. The plans contemplated the incorporation of the existing yard as an integral part of this unit and the addition of enough tracks, 16 in number, to bring the capacity to 2,800 cars. An entirely new arrangement of ladders was designed to provide for hump operation and the use of car retarders and power switches. As a part of this work, the southerly two-thirds of the existing yard was raised to a new grade line to conform to the requirements of gravity switching. Work on this unit was started in October, 1930, and completed February 15, 1931.

The northbound receiving yard is a new unit consisting of 8 tracks having a capacity for 900 cars. It is located directly south of the classification yard and immediately east of the southbound yard. It contains 47,000 lin. ft., or 9 miles, of trackage. Two and one-half months were consumed in the construction of this unit, the period terminating with the four months' period required for the completion of the northbound classification yard. It was opened for service simultaneously with the latter on February 15, 1931.

The three units of the yard involved the construction or relocation of 67 miles of track. New 105 lb. rail was laid in the switches of the northbound receiving yard and in the ladders and turnouts of the two classification yards except at the north end of the original tracks of the northbound classification yard, second hand 100-lb. or 105-lb. rail being used elsewhere. The ties are creosoted. The turnouts are all No. 10 in the southbound yard and No. 8 in the northbound yard except at the north end of the 16-track addition to the latter where No. 10 turnouts were installed.

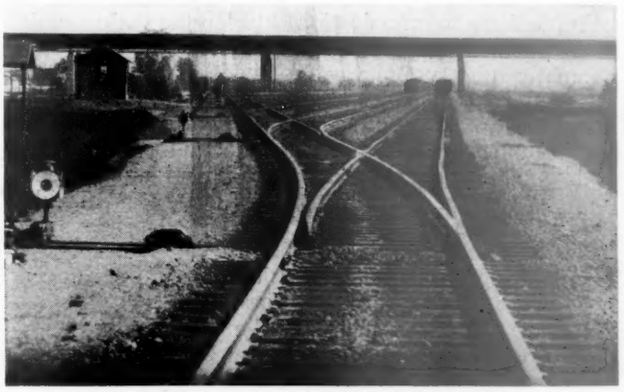
Nearly 200,000 cu. yd. of ballast was placed under the tracks. Of this amount 81,000 cu. yd. of crushed slag and 28,000 cu. yd. of stone screenings were used in the northbound classification and the receiving yards, while in the southbound receiving yard most of the 90,000 cu. yd. placed was crushed stone, the remainder being cinders and gravel.

The grading of the yards totaled 392,000 cu. yd. of embankment of which only 110,000 cu. yd. was clay excavated from local borrow, channel changes, etc., all the rest being material involving train haul over a considerable road mileage. A total of 171,000 cu. yd. consisted of stone screenings from Spore, Ohio, Holland and Findlay, and Monroe, Mich., the maximum haul being about 50 miles. Granulated slag to the amount of 12,000 cu. yd. was obtained at Toledo, and 99,000 cu. yd. was sand from a borrow pit at Woodside, Ohio, requiring a haul of 16 miles. This sand was introduced as a means of guarding against settlement within the car retarder and power-switch area on the descending side of the hump of the northbound classification yard.

In addition to the Avenue Road viaduct the project embraced a double-barrel culvert of 12-ft. spans to carry Cedar creek under 18 tracks of the southbound classification yard, a similar culvert under 10 tracks of the northbound receiving yard, and a number of smaller culverts. The quantities of concrete, reinforcing steel and structural steel required for these various structures were recorded at the beginning of this article. A total of 55,000 cu. yd. of fill was required for the approaches to the viaduct.

Car Retarders and Signal System

In designing the northbound classification unit, the requirement for hump capacity was fixed at 3,000 cars in 24 hr. Immediately below the first retarders, three in number, the hump lead divides into three secondary routes and these in turn are further subdivided to connect with the seven groups, comprised of six tracks each, which make up the body of the classification yard. Electrically-operated car retarders to the number of 20 are located on the hump lead and on each of the diverging routes to control the speed of cars and maintain sufficient separation to insure the throwing of switches between the individual cuts.



Northbound Receiving Yard from the North

Three towers are required to control car speeds over the hump and to direct the various cuts along their proper routes. Tower A, which was built as a part of the power house, contains the controls for the first three retarders and the eight power switches at the first two diverging routes. The controls for the remaining retarders and switch machines are divided between Towers B and C. The window construction of these towers has a minimum of frame work, thus facilitating the view of the operators, and they are so located that they give a broadside view of the cars while they are under the control of the several towers, so that the operators are better able to judge the car speeds.

A two-position color-light signal is located at each switch, giving red and green indications in two directions to indicate the position of the switch points. A three-position hump signal, located at the crest of the hump, displays four indications: Green—hump fast; yellow—hump slow; red—stop; and yellow and red—back up. In addition to this, a three-position two-direction signal is located at the north end of the receiving yard to repeat the indications displayed by the hump signal. A third signal, of the two-piston color-

light type, known as the trimmer signal, which faces the classification tracks, controls the movement of engines between the crest of the hump and the clearance points of the classification tracks. All of these signal indications are controlled manually by means of a selector which is located at the crest of the hump. A lever in Tower A may also be used to display a stop indication in the hump signal when necessary.

Fogs are frequent in this territory and often are of such intensity as to interfere seriously with hump operation. To eliminate, so far as practicable, delays incident to these atmospheric conditions, a system of continuous-inductive cab-signal control was installed, to repeat in the cabs of the hump locomotives the signal indications displayed by the hump signal and its repeater signal. The color-light system of indications is the same, except that the back-up indication is given by a blue light.

Contracts for the car retarder and signal installation were awarded on November 11, 1930. Work on these systems was started in December and completed February 15, 1931, making the construction period only a few days more than two months.

Auxiliary Facilities

To facilitate communication between the various units of the yard, and speed up the handling of waybills, a pneumatic tube system was installed. This consists of three units having a combined length of three miles. One station at the south end of the yard connects the terminal office with both the southbound yard and the northbound receiving yard. The second unit extends from the terminal office to the yard office at Walbridge road, while the third unit, which is used primarily to receive and forward mail by passenger train, connects the Walbridge Road office with Stanley interlocking tower at the Toledo Terminal crossing.

Teletype machines facilitate the sending of switch lists from the terminal office to the hump and towers. Intercommunication between the terminal office, the hump and the control towers is accomplished by means of a local telephone system and loud speakers, the conversations being audible at any one or all of these stations. Six floodlight towers, varying from 74 ft. to 90 ft. in height provide night lighting for the hump and classification yard. The total connected lighting load is 70,000 watts, and the area covered by the lighting is 200 acres.

Electric power is used to operate the car retarders, the air compressors which serve the pneumatic tube system and for charging the train braking systems, the fire pumps, the water-supply pumps, the sewage disposal plant, Stanley inter-locking and for all lighting requirements. Power is taken from a commercial power line at a point about 1,000 ft. east of the hump. The incoming power is transformed from 6,900-volts, 3-phase, 60-cycle to the desired characteristics at six substations, the total capacity of which is 480 kw. The power house for the operation of the retarders and switch machines is a one-story brick structure which is divided into three rooms, one for the motor generators and switching equipment, another for the storage battery which provides the emergency current for the retarders and power switches, and the third for a work shop, Tower A being superimposed on this structure.

Terminal Office Building

Office facilities are provided in a three-story brick building 36 ft. by 66 ft. on a concrete foundation. All floors are of concrete. The doors and sash are metal and all partitions are of the portable metal type. The interior wall surfaces on the upper floors are finished with hard-burned, unglazed, cream-colored, washable brick, which has the advantages of eliminating glare and reflection and of being easily and cheaply cleaned. The ground floor contains the heating plant, a work room for electrical maintainers, locker space and toilet facilities for trainmen and a record room. The second and third floors afford office space for a track supervisor, a trainmaster and his organization, the railway police and the agent's force.

An unusual feature is embodied in the floor plan, which consists of a diagonal projection at the corner of the building nearest the hump. On the second and third floors this extended room is occupied by the yard masters, who, under supervision of the assistant general yardmaster, direct yard movements. Through this arrangement it is possible for each of them to observe a sector of 270 deg., covering the entire switching area, without leaving his chair. This building was constructed in two months' time during severe winter weather.

Water Supply and Sanitation

Water for locomotives is obtained from the Maumee river, the intake and pumping station being located about three miles north of Walbridge road. There is also a connection with the Toledo water system from which water required for locomotives can be obtained if desired. City water is used for drinking and sanitary purposes.

As there are no public sewers in the vicinity of the yard, a septic tank was installed under the direction and supervision of the state board of health. From this tank, by means of electrically-driven automatically-controlled pumps the sewage is deposited on filter beds from which final disposition of the effluent and solids is made. The installation is of sufficient capacity for 150 persons.

Y. M. C. A. facilities were provided by remodeling the former yard office. The completed structure is 28 ft. by 56 ft. and three stories high. The concrete foundation is extended to the ceiling line of the ground floor; the upper floors, which constituted the former office building, contain the restaurant and recreation and sleeping quarters to accommodate 40 men. On the ground floor are the heating plant, the toilets and the shower baths.

All contracts were awarded on a unit-price competitive basis. The contract for grading, track laying, buildings, masonry for bridges and culverts, drainage and sewer systems was awarded to the Walsh Construction Company, Davenport, Iowa. The McClintic-Marshall Corporation, Pittsburgh, Pa., fabricated and erected the structural steel in the Avenue Road viaduct. The car retarders and the signal systems were installed by the General Railway Signal Company, Rochester, N. Y.

Plans for the work were developed under the general direction of J. A. Stocker, chief engineer, who also directed the construction activities, assisted by the writer. Specifications for the car-retarder and signal systems were prepared by the signal department under the supervision of F. B. Wiegand, signal engineer, and B. J. Schwendt, assistant signal engineer. R. F. Finley, superintendent of telegraph and telephone, supervised the telephone and teletype installations. Field work in connection with the project was in direct charge of J. R. Scofield, assistant engineer, O. Falkenstein, supervisor of signals, and R. E. Rice, electrical supervisor, for their respective departments.

Heavier Loads Save Money

Filling cars to load limit benefits both railways and shippers—Co-operation and intelligent efforts bring results

THE heavier loading of freight cars offers an opportunity for railways to reduce the expense of handling available business. It is an opportunity which involves no increase in investment in equipment, no radical departure from ordinary railroad practice, and no additional administrative expense. All that is required is an understanding of the benefits of heavier loading and a small amount of time and effort necessary to explain to shippers that they, too, will benefit from heavier loading.

From the standpoint of the railroads, heavier loading of freight cars means reduced terminal costs, reduced mileage expense, reduced investment in equipment, and increased revenue per car. To the shipper and receiver, heavier loading of cars means reduced unit costs of handling freight to and from the cars, reduced demurrage expense, reduced switching expense, and lowered requirements in the way of industry track facilities.

The opportunities for heavier loading of cars are numerous. Every kind of freight car operated by the railways, and every kind of traffic which they carry is subject to underloading. It is difficult to estimate in dollars and cents the savings which railways and shippers would accomplish through the loading of freight cars to their load limit in every instance where this is possible. M. J. Gormley, executive vice-president of the American Railway Association and chairman of the Car Service Division, has estimated that 150,000 cars now in regular freight service could be eliminated if the other cars currently in use were properly loaded. An idea of the magnitude of the savings which can be accomplished through heavier loading is conveyed by this fact: That 150,000 cars, necessitating heavy terminal expenses, road haul expenses, and interest charges, could be scrapped if proper loadings were the universal rule rather than the local exception.

New Rule Not Known

Why do shippers fail to load freight cars properly, and why do railways fail to make sure that their cars are properly loaded by shippers? The basic reason seems to be ignorance, ignorance of the value to both railways and shippers of heavier loading, and ignorance of the extra capacity of modern freight cars. In many instances even now shippers and agents believe that cars are loaded to capacity when the load is up to the limit of 10 per cent over the rated capacity provided for under the old load limit rules. They are unfamiliar with the change in M.C.B. Rule 86 which increased the load limit of cars well beyond 10 per cent above rated capacity. For example, a car with a rated capacity of 100,000 lb., instead of being able to handle only 110,000 lb., under M.C.B. Rule 86 can accommodate sometimes as much as 120,000 to 125,000 lb. Under load limit rules now in effect, the rated capacity of a car means relatively nothing, while the all-important factor is the load limit stencilled on the side of the car. Yet knowledge of this fact is by no means so general as it should be, even among railway employees, and it is comparatively unfamiliar to many shippers.

Buying units commonly in use in industry also affect the loading of cars. Buyers, accustomed over a period of years to purchase materials or commodities in certain quantities, are inclined to continue to do so, but the buying unit which fitted the freight car of 20 or more years ago is too small for the modern, larger freight car. The result is that orders are currently being placed for quantities, which, when loaded into freight cars, inevitably mean light loads. For example, coffee was formerly loaded 250 sacks to the car to fit the common buying unit of coffee purchases. There was no particular reason for this except that it always had been done. A change in the buying unit now makes possible the loading of 550 sacks of coffee to a car, and the economy resulting therefrom is obvious.

Car Service Division Gets Results

The Car Service Division of the American Railway Association undertook its campaign for heavier loading of freight cars in 1927. It is carrying on a campaign of education of both railway employees and shippers which has shown encouraging results, particularly during the last year. Its method of operation is simple. Upon request from a railway, a car service agent is assigned to travel over the road, examine its records, and determine what commodities are being loaded too lightly and what shippers are not utilizing the full capacity of the freight cars made available to them. Upon the completion of this investigation, the agent brings his findings to the attention of railway officers and employees as a group, pointing out the direct benefits which they can secure through proper loading of cars.

The results of these investigations, in many instances, are illuminating. A few examples of light loading and the results obtained through the correction of this condition may be interesting.

More Revenue Per Car

A large receiver of flour in New England, when interviewed on the matter of heavier loading of cars assigned to him, promised to take it up with the shippers. A later check indicated that the loadings from one shipper had been increased from 58,980 lb. per car to 73,500 lb. per car, with an increase in revenue per car of $14.24. Another shipper increased the loading from 59,200 lb. per car to 74,025 lb. per car, with an increase in revenue per car of $81.43. The movement of flour from a mill in the middle west to a large chain store in New England was increased from an average of 58,980 lb. per car to 72,030 lb. per car, an increase of 6½ tons, and an increase in revenue per car of $41.24. A large shipper of flour in Minnesota, shipping to its own warehouses, was found to be loading 49,300 lb. per car, regardless of the size of the car furnished. This shipper was prevailed upon to issue instructions to the effect that all 80,000-lb. capacity cars should be loaded to 89,000 lbs., and all 100,000-lb. capacity cars should be loaded to 110,000 lb. Under the new loading arrangement, this tonnage is moving in less than half as many cars as were previously required.

Cement for use on a road construction project in

New England was moving 924 bags, or 87,780 lb., to the car. The contractor on this job agreed to increase his cement orders to 1,200 bags at a time, and these were moved 114,000 lb. to the car, an increase of 13 tons per car. A receiver of cement in the southwest had been taking loads averaging 76,000 lb. He was persuaded to increase his loads to 95,000 lb., increasing the revenue per car by $16.15. Under the old system of loading, the movement had amounted to 35 cars per month. Heavier loading has eliminated one car out of every five.

A large corporation receiving 1,000,000 tons of coal a year from one shipper was shown that, if all cars were loaded as heavily as one which was discovered in the car service agent's check, the elimination of 2,553 cars in a year would be possible. This was done. A company in the middle west, receiving about 6,000 cars of coal a year, was able to reduce its car requirements by 5 per cent through better utilization of car capacity.

Shippers Accept Suggestions

Bulk corn meal and corn cake moving to a receiver in Tennessee had been averaging from 65,000 lb. to 70,000 lb. per car. Upon solicitation, the receiver instructed the shipper to load the cars to their full cubical capacity, which gave a load of approximately 82,000 lb. This has resulted in an increase in revenue per car of $25.46. A soap manufacturer had been receiving bulk salt averaging 90,641 lb. per car. The loadings were increased to 110,000 per car, increasing the earnings per car by $34.85. A New York shipper of salt, loading 3 cars a week, increased the loading from 60,000 lb. to 80,000 lb. per car. This increase in loading of 10 tons per car meant an increase in revenue per car of $51.

The loading of cast iron pipe was increased from 49,829 lb. to 82,111 lb. in a movement into the southwest. This was a contract movement of 25,000 tons, and the average revenue per car was increased $193.85. A consignee in the middle west was receiving sugar at the rate of two cars per day, loaded 600 bags, or 60,450 lb., to the car. This receiver instructed the shipper to load future shipments 800 bags, of 80,600 lb. to the car, and the increase in revenue per car was $113.96. A receiver of galvanized wire in the southwest had been receiving cars loaded to about 50,000 lb. After solicitation, this consignee instructed the shipper to load the cars to 90,000 lb., which brought an increase in revenue of between $250 and $300 per car. A brick company holding a contract to ship 3,500,000 brick to one consignee at one destination agreed to load his cars to capacity. Cars of 100,000 lb. capacity were loaded to 122,500 lb., earning a revenue per car approximately $150 in excess of the revenue which would have been obtained if the cars had been loaded as lightly as they had been in the past. More than 100 cars were saved in this one instance.

Several roads have found out in dollars and cents what heavier loading means. On the Missouri Pacific, the average load per car was 31.53 tons in 1929, and 32.51 tons in 1930, an increase of 0.98 tons per car. This was equivalent to a saving of 24,983 cars, 8,674,097 car miles, and 190,830,147 gross ton miles. The saving in transportation expense was $132,937, the saving in per diem, $202,997, or a total of $335,934. The Illinois Central, by increasing its loadings one ton per car, saved $570,823 in 1930. This figure is based upon 294, 186 car days at $1.00 a day, and a saving in transportation expense, at the rate of 1.03 mills per gross ton mile, on 268,579,593 gross ton miles, of $276,637.

Increased loadings depend upon three interested parties, the shipper, the receiver, and the railroad. Of the three, the shipper probably exerts the largest influence. He controls the actual loading of the car. He is governed at times by what the buyer orders, but even this obstacle can frequently be overcome to the advantage of both the shipper and the receiver. That the shipper needs to be more vigilant in loading cars is indicated by numerous instances of light loading developed in the investigations of the Car Service division where the matter is entirely in the shipper's hands; for example, in shipments from factory to warehouse. Investigations have also revealed instances where minimum shipments are made to consumers who would prefer maximum car loads.

From the standpoint of receivers of freight, investigations have shown that, without materially increasing inventories, receivers have it within their control very greatly to increase the tonnage delivered on their orders. Specifying full carloads on commodities received daily, or at frequent intervals, has been found practicable and has resulted in substantial savings in demurrage, switching, and unloading costs, as well as relief in congested terminals.

As the direct beneficiaries of heavier loading, the railroads, according to the Car Service division, should set an example, when buying materials in carload quantities, by specifying maximum instead of minimum quantities, wherever this is practicable. Commercial tonnage under the control of the carrier, such as cargoes received at ship side, can ordinarily be handled in full carloads, but instances of light loading due to inattention are not infrequent.

What Railways Can Do

The Car Service division has recommended certain steps which any railroad can take and which have been found effective in bringing about heavier loading of cars. The first recommendation is that agents be required to abstract, on a form to be provided, the names of all carload shippers at their respective stations, who in a period of 30 days have shipped to the same receiver at the same destination four or more carloads of the same commodity, and likewise to report the names of all receivers at their respective stations, who in a 30-day period have received from the same shipper at the same point of origin four or more carloads of the same commodity.

The Car Service division further recommends a closer contact between the executive and supervisory forces through conferences devoted to the study of heavier loading. It also recommends the organization of special committees on heavier loading on each division, so that there will be an opportunity for close study of the traffic originated on the line.

Traffic representatives on and off the line can be of material assistance in the heavier loading campaign. They know of large movements in advance and can acquaint shippers with the advisability of heavier loading of cars. One suggested method of securing the co-operation of traffic representatives is to establish an efficiency rating for them, based on tonnage secured per car, rather than on gross tonnage, total revenue or total number of cars, as is sometimes the practice. Safeguards could be set up, of course, to prevent the intensive solicitation of heavy tonnage, light revenue traffic to the detriment of light tonnage, heavy revenue movements.

The purchases and stores departments should be held accountable for maximum loading of all company material. Reports of movements of company material

should be available for examination by those supervising heavier loadings. These reports should be made by the purchasing department and should not be left to chance checks disclosing underloading of material for company use.

The car distributor is an important man in any effort toward the heavier loading of cars. Where a movement of freight is relatively constant, the car distributor is in a position to assign to it equipment large enough to accomplish the movement in the minimum number of fully-loaded cars.

N. Y. Fuel Hearings Enter Second Week

NEW YORK hearings in connection with the Interstate Commerce Commission's investigation of railway fuel practices (Ex Parte 104, part 1) entered their second week on February 9; Examiner C. W. Berry is presiding while the examination of carrier witnesses is being conducted by Attorney M. C. List. Six of the New England roads which responded at the opening sessions reported in the *Railway Age* of February 6 were followed in turn by the New York, New Haven & Hartford, the New York, Ontario & Western, the New York, Central, the Pittsburgh & Lake Erie, the Delaware & Hudson and the Delaware, Lackawanna & Western.

Following the same general plan of presentation which was outlined in last week's issue, C. E. Smith, vice-president in charge of purchases of the New Haven, outlined the fuel buying policies of that road. Mr. Smith revealed that the annual bill of the New Haven for all coal purchased has been reduced from approximately $12,000,000 in 1922 and $13,000,000 in 1923 to $4,700,000 in 1931. This record, the witness said was due to several things, among which he listed: Better service at the mines, i.e., better preparation of coal; better locomotives and expenditures for modern fuel saving devices on locomotives; better supervision of firemen and better operation which permits trains to get over the road faster and thus produce the same number of gross ton-miles while burning coal for fewer hours. In 1923 the New Haven system average was 237.1 pounds of coal per thousand gross ton-miles while in 1931 it was 121.2.

As a result of analyses and road tests over a period of years, Mr. Smith continued, the New Haven has determined that coal from the Island Creek, Fairmont and Greensburg districts is suitable for its use; at present it is getting coal from three mines, one in the Fairmont district in West Virginia, one in the Greensburg district and one in the Scott's Run field of the Fairmont district on the Monongahela. The New Haven, it developed, buys a portion of its coal on the basis of competitive bids received in accordance with the provisions of the Clayton Act. This is because a director of the New Haven is interested in the New England Coal & Coke Company. Contracts for supplying the remainder of the requirements are parceled out among New England coal dealers who are shippers of commercial coal over the New Haven. In this latter connection, Mr. Smith explained, monthly reports of commercial shipments are solicited and, while no set traffic yardstick enters the allocations, an understanding is reached as to where each shipper stands. Both competitive and non-competitive traffic is considered since the witness held, virtually, all coal traffic is now competitive when highway and waterway carriers are considered. As to this policy, Mr. Smith concluded, the New Haven feels that "if it doesn't cost anything in quality or price it is right to work with those who work with us."

The New York, Ontario & Western, having invited bids from a list of approved mines, usually accepts the lowest bid offered by a satisfactory mine. This road, however, uses a certain amount of anthracite from the mines of the Scranton Coal Company, and O. & W. subsidiary. The entire output of the Scranton Coal Company mines is purchased by a coal dealer but the railroad accepts from this dealer certain accumulations of coal which is unsalable in the commercial market.

W. C. Bower, vice-president in charge of purchases and stores, was the New York Central witness; his testimony related also to the Michigan Central, the Cleveland, Cincinnati, Chicago & St. Louis, the Indiana Harbor Belt and the Chicago River & Indiana. The New York Central buys the bulk of its fuel from mines located on its own lines and allocates orders on the basis of commercial coal traffic received. Mr. Bower's testimony in this connection was substantially the same as that given by him in I. C. C. 22,455, Reciprocity in Purchasing and Routing, and reported in issues of the *Railway Age* during March, 1931. Briefly, the New York Central sends out inquiries and then fixes a uniform price that it will pay for coal from each producing district. The total fuel requirements are then allocated among the nine major districts on the New York Central lines and the district quota is broken down into individual orders on the basis of commercial coal traffic received. If, for example, 50 cars of fuel were to be bought in a district, an operator who had shipped 10 per cent of the commercial coal from that district would be entitled to a New York Central fuel order for five cars. No yearly contracts have been entered into by the New York Central since 1926; fuel is supplied on monthly shipping orders.

With reference to the price which the New York Central pays for its fuel, Mr. Bower conceded that commercial buyers and other railroads have purchased the same coals at a lower figure. He explained, however that the New York Central, being interested in the welfare of its coal operators, desires to pay a fair price which contemplates a fair profit for the producer; he did not think that under present production schedules the operators were making a profit on New York Central fuel orders. The New York Central, he continued, does not take the output of mines nor any part thereof; its price is based on low bids submitted by operators who, in framing their bids, had the proportionate distribution policy in mind. Orders at present are in effect for as little as one-tenth of a car a day; in the Clearfield district producers receive such an order if they ship 17,000 tons of commercial coal a year. In other districts no order for less than one-fourth of a car a day is in effect.

The Pittsburgh & Lake Erie, its witness revealed, follows the same general policy as the New York Central with respect to selection, inspection and pricing its fuel but an operator must be a shipper of 100,000 tons of commercial coal a year over the P. & L. E. to become eligible for a fuel order. Final cross-examination of Mr. Bower was deferred until his appearance at the Chicago hearings on March 22 and meanwhile the New York Central will revise in certain respects its response to the I. C. C. questionnaire of August 5, 1931.

More Support For New Section 15a

Commissioner Eastman furnishes detailed estimate of recapture liability

By Harold F. Lane

Washington Editor, Railway Age

WASHINGTON, D. C.

HEARINGS before the House committee on interstate and foreign commerce on the Eastman-Rayburn bill to substitute a "flexible" rule of rate-making for the "fair return may be" rule of Section 15a were scheduled to be concluded by the end of this week. The committee does not expect to begin its executive sessions for the purpose of drafting a bill, after making selections from the various verbal amendments suggested by interested organizations, until after the record of the hearings has been printed, but it expects to revise Section 15a at this session of Congress and hopes also to pass a bus bill and the Rayburn bill to enlarge the authority of the Interstate Commerce Commission over acquisitions of railways. Hearings on the latter bill will begin next Wednesday. The committee probably will not take up at this session the investigation of competing forms of transportation recommended by the commission.

After further questioning of Commissioner Eastman on Tuesday the committee planned to hear representatives of the electric railways and also of the Railway Business Association and the National Association of Owners of Railroad and Public Utility Securities, who have joined with the Association of Railway Executives, the American Short Line Railroad Association, the National Industrial Traffic League and the National Association of Railroad and Utilities Commissioners in expressing general approval of the bill provided it is made to include retroactive repeal of the recapture provisions. The security owners' organization is the successor to the association which was largely responsible for the form in which Section 15a was enacted by Congress in 1920.

So much unanimity has already been expressed as to the general purport of the language to be used in laying down a legislative policy to guide the commission that very little remains to be said on that point. The only direct criticism of the language of H.R. 7117 expressed by any of the organizations was that of John E. Benton, representing the state commissions, who objected to any specific reference in the bill to the necessity for maintaining the credit of the railroads, although the commission of the shippers' league had emphasized the importance of including a definite recognition of that factor. However, Alfred P. Thom, general counsel for the Association of Railway Executives, said he was perfectly willing to leave out the word "credit" and make the need of the public for transportation the criterion rather than the need of the railroads for revenues, because it is axiomatic that adequate transportation cannot indefinitely be maintained on inadequate revenues.

Comparatively little objection to revision of the rate rule has been indicated by members of the committee and if that were the only question involved it probably would not take long to agree on a bill or to put it through the House and Senate. In fact it would undoubtedly take far less time and effort than were required to obtain the enactment of 15a in the first place, at a time when the railroads were earning no net at all, or than have been required to keep Congress from repealing it outright on several occasions in the past.

Recapture Sums Still Dubious Estimates

The other question involved is whether the recapture provisions shall be repealed retroactively or only for the future and the first impression of many members of Congress has undoubtedly been that if any railroad has been so fortunate as to earn more than 6 per cent it is not entitled to much sympathy. But when they are shown, as the House committee has been shown, that most of the alleged recapture liability is still in the stage of an estimate, based on a valuation formula of the commission's that still bristles with questions not yet passed upon by a court, and that much of the money has already been consumed in meeting deficits for later years, the matter is likely to take on another aspect.

Chairman Couzens of the Senate committee on interstate commerce, which during the last session of Congress was the silent forum for a written debate between the Interstate Commerce Commission, the railroads, the shippers, the State Commissioners, and Donald R. Richberg on the bill proposed by Senator Howell as a substitute for 15a, has expressed himself as being opposed to any retroactive repeal of recapture, although he said he had an open mind as to its repeal for the future.

Also, the influence of the President of the United States may be expected to have some effect if the bill is sent over to the Senate from a Democratic House, as it is apparently now to be understood that he knew what he was talking about when he recommended a revision of the laws regulating transportation in his annual message without indicating what kind of revision he had in mind.

It has been suggested that the railroads, in acquiescing in the commission's proposed substitute, are trading a blank check so far as rate-making is concerned for freedom from recapture liability, but on the other hand it has also been suggested that the general language of H.R. 7117 is about as definite as a percentage "as nearly as may be" on a valuation which they have not yet got and which has been proceeding along lines they have bitterly criticized. If the $378,000,000 of estimated recapture of which they are to be relieved is "stage money," the $137,000,000 they have been required to expend for valuation is not, and either sum is more than they have ever collected in rates that could be attributed very directly to 15a.

The prompt acquiescence by the railroads in a rule of rate-making which has seemingly emanated chiefly from the National Industrial Traffic League and Commissioner Eastman came as something of a surprise to many who had followed closely the arguments of

railroad lawyers in rate cases before the commission and in the recent western grain rate case in the courts, but it is not inconsistent with the position which has been taken by Mr. Thom before Congressional committees on the various bills that have been introduced since 1920 to repeal 15a. Neither is it much more startling than the sudden abandonment by the commission of its rate base plan, which it had recommended in its annual report in December, and which was embodied in H.R. 7116.

In other words, in the long and stormy controversy over 15a since 1920, just as in the controversy over another law in which Congress unsuccessfully attempted to express a constitutional amendment in terms of a statutory percentage, there have been advocates of repeal and advocates of modification and the revisionists have been given an opportunity in the growing realization of the grotesque results of the operation of the recapture plan. It is understood that the position taken by Mr. Thom at the hearing was authorized by the executives' association a long time ago.

Probably there will be some to rise and declare that the railroads are losing their interest in valuation because of the prospect of falling prices that might carry the cost of reproduction below the investment level. The fact remains, however, that they have never asked for rates so high as would have been required to produce a fair return on value in the years when prices were highest although they have continued to fight for an adequate valuation and they have declined to accept the commission's suggestion that investment be adopted as a rate base. Recapture therefore seems to have been the rock on which the whole scheme of 15a has been wrecked, although there have also been indications that the commission felt that the law set too high a standard unless it were treated as a maximum, because it has finally reached a stage where the commission is trying to collect alleged excess earnings that in most instances have long since been swallowed up in deficiencies if not actual deficits.

In concluding his statement before the committee on February 5, Mr. Thom submitted a copy of the bill, H.R. 7117, on which he had pasted all the changes in language he would propose, including a sentence in the rate-making rule which he had not previously mentioned, and also his proposed changes in the provisions repealing the recapture clauses and the valuation act, which is section 19a of the present law.

Amendments Proposed by Mr. Thom

The rate making provision in the new Section 15a as proposed by Mr. Thom is given in an editorial elsewhere in this issue. In addition, the bill, in Mr. Thom's opinion, should provide as follows:

In years when the net railway operating income of any carrier exceeds six per cent of its property investment account, one-half of the excess over that percentage shall be preserved by it in cash or in liquid form for use in years when its net railway operating income falls below six per cent of such property investment account; provided, that no carrier shall be required to make any such reserve of cash or assets in liquid form in any year unless, in that year, its net railway operating income is more than sufficient to provide for its fixed charges; provided further, that after such reserve fund has been accumulated and maintained at an amount equal to five per cent of its property investment account, the remainder of its net railway operating income may be used by it for any lawful purpose.

On and after the effective date of this Act, all moneys which were recoverable by and payable to the United States or to the Interstate Commerce Commission, under the provisions of paragraphs (5) or (6) of section 15a of the Interstate Commerce Act, as heretofore existing, shall cease to be payable to and recoverable by the United States or by the Commission, and all proceedings pending for the recovery of any such moneys shall be terminated.

The commission would be required to liquidate the general railroad contingent fund within sixty days after the passage of the act. Other provisions he favored are as follows:

"All requirements and restrictions imposed by the provisions of paragraphs (6), (7), and (8) of section 15a as to the one-half of the excess earnings, as defined therein, which a carrier is permitted to retain, are hereby removed and repealed.

"That section 5 of the Interstate Commerce Act, as amended June 10, 1921, be, and it is hereby, further amended by striking out subdivision (b) of paragraph (6) and lettering as (b) the next succeeding subdivision, which is now lettered (c).

"That section 19a of said Act be, and it is hereby, repealed. The Commission shall carefully preserve in its archives all documents and papers connected with work so far done by it under said section and shall hereafter keep itself informed of all new construction, extensions, improvements, additions, betterments, and retirements and of all changes in investment therein."

Valuation Not Necessary to Security Regulation

Replying to the suggestion that a valuation would be needed by the commission in regulation of security issues, Mr. Thom said that it needs no such elaborate valuation as is required by 19a and that this is proved by the fact that it has been regulating all security issues of the roads since February, 1920, without the aid of this valuation "because the valuation has not yet been made."

The cost of the valuation work from 1913 up to the end of 1931, Mr. Thom said, was $177,927,793, of which $40,148,906 represented the cost to the government and $137,778,886 the cost to the carriers. His proposal was that the valuation work should be stopped. "So far as I know," he said, "its only office would be in confiscation cases. The commission would have an inventory of the carrier property up to date and there would be no dispute as to what the property was; only as to the value and that must be determined by the courts. I don't see how any interest of the government or the carriers would be prejudiced." In reply to a question Mr. Thom said that the difference between his suggestion and that of the commission was that his amendment would not require the commission to complete its original valuation. Asked how long that would take, he said he did not know but that if recapture should be continued the commission will never complete its valuations because it would have to have a valuation for every year. "The commission has a very satisfactory survey of the relation between capitalization and value," he said, "which was the original purpose of the valuation act."

Mr. Thom said he did not think there can be such a thing as unreasonable earnings from reasonable rates because if a road earns large profits from reasonable rates it is attributable to the quantity of service it renders rather than to the rates and he asked the committee to give careful consideration to this. When he pointed out that the roads in the Pocahontas region had been prosperous because of their large and increasing volume of traffic, Representative Gillen said that this had made him wonder if there was not some virtue in recapture after all, because the Norfolk & Western and Chesapeake & Ohio can haul coal to Chicago from Charleston, W.V., at a cost 50 per cent less than that of the roads that carry it from Terre Haute. Assuming that the recapture fund were available, he said, would it not be equitable if the Pocahontas roads,

against which the commission has recapture claims amounting to about $100,000,000, were required to distribute that to the weaker roads. If they were to retain it he said they would be enabled to give a superior service. Mr. Thom said that in the first place the question as to whether those roads will owe the government that much will not be settled for years, because of the great differences between them and the commission as to the valuation, but that superior service should not be withheld simply because some other section of the country cannot serve so well. He said he thought the proper remedy would be to ask the commission to fix the proper differential, as was done in the lake cargo coal case. However, he asked that the main question be not lost sight of, that to attempt to collect the recapture money would cause great injury. Mr. Gillen later explained that the actual rate from Charleston to Chicago was higher than that from Terre Haute but that the rate per ton per mile was 6.36 mills from Charleston and 9.4 mills from Terre Haute.

Some Roads Prefer Present Rate Rule

Returning to the discussion of the rate-making rule Mr. Thom said that the railroads are not in entire agreement and that "a very substantial element value the present rule very highly" and that he was not in a position to say that they are in favor of the proposed new rule of rate-making unless the recapture clauses are repealed retroactively. "The rate-making rule and the recapture repeal are inter-related so far as my statement and my authority are concerned," he said, "and I am proposing a homogeneous system of regulation."

When he submitted his proposed amendment to require any road that earns more than 6 per cent to preserve one-half the excess in cash or liquid form in a reserve fund for use in years when its net falls below 6 per cent Mr. Thom said he had submitted it to some of his clients but not to all, and that although he had found no dissent he was not authorized to present it on behalf of all the railroads. He said the idea had been suggested by the commission both in its recent rate decision and in its annual report to Congress and that he believed the commission's position to be a sound one. Chairman Rayburn asked if the proposal to base this reserve fund on property investment would not get back to the complications which had caused the commission to say that 15a was an impossible rule. Mr. Thom replied that he did not think so. He pointed out that this was a proposal to deal with the railroad's own money and also that the amount of net and the property investment are definitely shown in the reports, so that merely an inspection of the accounts would be required to enforce it.

Short Lines Urge Recapture Repeal

Officers and members of the American Short Line Railroad Association appeared on February 4 to urge repeal of the recapture provisions and expressed approval in principle of the rate-making rule proposed in H. R. 7117. They presented resolutions adopted at a largely attended meeting of short lines held the day before, in part as follows:

> Inasmuch as the recapture provisions of Section 15a of the Interstate Commerce Act have not only proven utterly useless to the necessitous railroads for which they were intended, but, to the contrary, are a cloud upon the financial integrity of all the railroads and if enforced would result in ruin to such short and weak railroads as are subject to the payment of recapturable excess, it is therefore the sense of this convention that all of the recapture provisions of Section 15a of the Interstate Commerce Act should be repealed and declared of no force or effect from the effective date of the Transportation Act of 1920.

Bird M. Robinson, president of the association, said that in 1919 the late S. Davies Warfield, president of the National Association of Owners of Railroad Securities, which had originated the plan of 15a, had first asked and then attempted to force the association to support the plan on the ground that would be of benefit to the short lines, but that they had found it to be a "delusion and a snare" and had declined to do so. To show the heavy expense imposed upon short lines by the recapture valuation and earnings examinations he said that replies received from 144 short lines to a questionnaire showed that the commission's representatives had spent 38,342 man-days and the roads 34,850 man-days and $284,164 in ascertaining the amount due. He said that if the earnings of the short lines were to be averaged for the period not a cent would be recapturable and he thought the same statement would be true for all roads.

Ben B. Cain, general counsel of the association, said that the association favors H. R. 7117 provided the repeal of recapture is made retroactive, and to indicate that the law had not worked out as intended he showed that of the 97 roads that have made some payments to the contingent fund, mostly under protest, only 11 were Class I roads and they were roads of generally less than 500 miles. Not a single representative Class I road has paid anything into the fund, he said, and the only case in which the commission has issued a final order against a Class I road, that of the Richmond, Fredericksburg & Potomac, is in court. He also filed a statement showing the claims that have been made by the commission in 105 recapture cases in tentative reports and three final decisions, making a total of $43,000,000, of which over $15,000,000 represents its claim against the Norfolk & Western, and said that none of these reports showed an excess for each year for any road. The recapture fund in possession of the commission now is about $13,000,000, of which about $3,000,000 represents interest, but it is not being used and the trust for which it was created has absolutely failed. The only possible beneficiaries are the necessitous carriers, many of which have contributed to the fund but could not borrow from it if more money were available because they could not furnish adequate security and if they could they could borrow elsewhere for less than 6 per cent.

Representative Hoch, who had been persistent in asking the various witnesses if the roads in the recapture class had not paid dividends for some of the years for which they are now asking that recapture be repealed, showed great interest in the figures for the Norfolk & Western in the list and asked if that road had not paid dividends. He read from an investors' manual that it had earned from 14 to 25 per cent on its stock and asked Mr. Cain to furnish its percentage on value. When he kept asking Mr. Cain if he thought such a road should have its recapture "remitted" Mr. Cain finally replied that "it is generally known that the Norfolk & Western is perhaps the most prosperous road in the country" and that it was not in the class of roads for which he was speaking.

Several other representatives of short lines against which the commission has set up recapture claims for one or more years also testified to show that any excess had been more than offset in other years.

Representative Kerr, of North Carolina, created some diversion by asking repeal of the recapture provisions so that the commission could return some $32,000 it has recaptured from the Warrenton Railroad, a three-mile line built by the town of Warrenton, N. C., in the eighties to connect it with the Seaboard Air Line. Asked if the road had not earned in excess of 6 per

cent he replied, "Oh, yes," but that this is a railroad that "belongs to the people." He said the town had issued $11,000 of bonds and some families had subscribed $3,000 to the stock to build the road originally and it has paid for itself and returned $160,740 to its owners since 1909, practically supporting the town, which now owns $50,000 stock while the three families have $16,000 of stock. He made the point that the recapture money was merely impounded in the Treasury, and that the big railroads had not paid because of the time required to complete their valuations, whereas the commission could value this road in "fifteen or twenty minutes." Chairman Rayburn remarked that this was the only ray of hope as to a railroad he had heard for some time but Representative Kerr feared the trucks and buses would soon put the road out of business.

Revised Estimate of Recapture Liability

A revised estimate of the recapture liability of 90 Class I roads, 138 Class II roads, 134 Class III roads and 84 switching and terminal companies for the period 1920 to 1930 was furnished by Commissioner Eastman on February 9, which makes a total of $361,465,815. He said that the previous estimate of $378,000,000 had been more carefully checked, and that while the commission had felt that the detailed figures ought not to be made public because they represented "mere estimates" and were "very rough" in many instances, the testimony of other witnesses had indicated that there had been some "leaks" and that the list of all roads which it is estimated may have recapture liability would be furnished to the committee to be made public by it if it so decided. It includes $336,443,378 for the Class I roads, $15,929,742 for the Class II roads, $2,259,036 for Class III roads, and $6,833,659 for switching and terminal companies not included in the Class I list.

Explaining the method of estimating the liability Mr. Eastman said that the method rejected by the court in the O'Fallon case had been used to a large extent. "When information in the files of the commission permits recapture liability has been based upon a value determined by according equal weight to original cost of structures, estimated if not known, and their cost of reproduction, with depreciation deducted and value of land and working capital added. If this information is not available, the value is found by adding to the single sum value, less working capital, shown in the final or tentative valuation reports under Section 19a, the net cost of additions and betterments with adjustments for property changes from year to year, plus working capital not in excess of the cash and materials and supplies as reported by the carrier. In the absence of any basic valuation data the book investment less depreciation is taken as the estimate of value. Generally the carriers' reported net railway operating income has been used in these computations." He referred to the first method as that used in the Richmond, Fredericksburg & Potomac case and, to show the difference between that and the O'Fallon method, said that if it were applied to the reports of the Florida East Coast and Seaboard Air Line, which have an estimated liability of about a million dollars each, the liability would be wiped out. The commission's forces are also working out an estimate of the excess earnings on the basis of an average for the entire period of 11 years which will be submitted later. The recapture liability estimate as presented for the Class I roads was as follows:

Chesapeake & Ohio	$47,779,611
Norfolk & Western	42,106,462
Duluth, Missabe & Northern	25,462,836
St. Louis-San Francisco	19,556,512
Southern Railway	15,838,881
Reading Company	13,749,555
Bessemer & Lake Erie	11,370,624
Atchison, Topeka & Santa Fe	11,015,315
Atlantic Coast Line	9,722,431
Elgin, Joliet & Eastern	9,374,365
New York, Chicago & St. Louis	8,817,555
Union Pacific	8,363,047
Missouri-Kansas-Texas	7,556,520
Virginian	7,364,770
Hocking Valley	5,241,114
Pere Marquette	4,933,075
Terminal Assoc. of St. Louis	4,893,664
New York Central	4,842,577
Texas & Pacific	4,183,231
Detroit, Toledo & Ironton	3,969,082
Union (Penna.)	3,814,226
Kansas City Southern	3,712,402
Chicago River & Indiana, etc.	3,360,573
Wheeling & Lake Erie	3,319,671
Baltimore & Ohio	3,211,587
Richmond, Fredericksburg & Potomac	2,891,766
Delaware & Hudson	2,476,627
Wabash	2,367,155
Belt Ry. Co. of Chicago	2,363,800
Detroit & Toledo Shore Line	2,270,903
Gulf Coast Lines	2,094,974
New York, New Haven & Hartford	1,966,710
St. Louis Southwestern	1,955,924
Monongahela Ry.	1,771,576
Kansas City, Mexico & Orient	1,771,437
Toledo Terminal	1,728,456
Duluth & Iron Range	1,670,203
Illinois Terminal	1,549,885
Lehigh & New England	1,425,271
Midland Valley	1,361,293
Denver & Rio Grande Western	1,263,075
Florida East Coast	1,213,479
Western Maryland	1,201,965
Delaware, Lackawanna & Western	1,185,785
Chicago & Illinois Midland	1,143,707
Toledo, St. Louis & Western	1,107,024
Bangor & Aroostook	1,096,453
Seaboard Air Line	1,094,540
Montour Railroad	944,670
Nevada Northern	913,743
Brooklyn East. District Terminal	864,524
Lake Superior & Ishpeming	834,114
Great Northern	782,730
Peoria & Pekin Union	709,848
Clinchfield	703,801
Pittsburgh & West Virginia	685,850
Chicago, Indianapolis & Louisville	639,160
Akron, Canton & Youngstown	527,931
Gulf, Mobile & Northern	517,797
Lehigh & Hudson River	510,516
Louisiana & Arkansas	487,002
Southern Pacific Co.	452,089
Western Ry. of Alabama	417,717
Louisville, Henderson & St. Louis	414,394
Buffalo, Rochester & Pittsburgh	402,839
Detroit Terminal	385,925
New Orleans Great Northern	325,408
Alton & Southern	319,960
Utah	222,616
Mississippi Central	222,226
Texas Mexican	186,139
Monongahela Connecting	167,543
Chicago & Alton	160,165
Louisville & Nashville	149,592
International Great Northern	139,661
Alabama & Vicksburg	127,361
Conemaugh & Black Lick	122,056
Pittsburgh & Shawmut	74,510
Buffalo & Susquehanna	66,891
Newburgh & South Shore	61,132
El Paso & Southwestern	61,037
Lake Terminal	58,589
Chicago, Terre Haute & S. E.	57,062
Ann Arbor	53,252
Missouri-Illinois	46,708
Bay Terminal	37,332
Georgia R. R.	31,080
Kansas, Oklahoma & Gulf	12,873
Charleston & Western Carolina	7,331
Green Bay & Western	6,510
Total	$336,443,378

Over Three Years Required to Complete Recapture Program

Commissioner Eastman mildly objected to Mr. Benton's statement that the commission had barely scraped the surface of its recapture work, but he said the Bureau of Valuation had estimated that the work could be completed up to the end of 1930 by July 1, 1935, based on its present program, covering an estimated liability of $83,000,000 by the end of 1932, $139,000,000 by 1933 and $143,000,000 by 1935. This, he said, is without making any allowance for litigation and he said he would be surprised if the questions involved could be covered in two or three test cases because there is a myriad of questions that can be raised and the Supreme Court seldom decides more than one point at a time. Mr. Eastman said that every tentative report served is a demand for the money unless the carrier protests and asks for a hearing but that the roads have not been advised of the estimates. Nine reports have been made

final and 97 tentative reports have been served, including a total of $25,000,000, while 23, covering $26,000,000, are practically completed. So far an average of 4.7 days has been required for hearings but the cases have involved the smaller roads.

He also submitted in response to questions asked during his earlier testimony, a large amount of additional data for the roads controlled by the United States Steel Corporation or its subsidiaries, of which 15 are on the recapture list and 10 are not. The 15 on the list, which he said represent about 15 per cent of the total recapture liability, had paid $84,947,625 in dividends during the period, out of a net income of $173.174,155, and the Bessemer & Lake Erie had paid dividends in each year ranging from 150 to 500 per cent, while the Duluth, Missabe & Northern had paid dividends each year ranging from 75 to 100 per cent. He pointed out that some of these roads are very much undercapitalized and that much of their property had been paid for out of surplus; also that they are able to handle a concentrated traffic profitably at rates which sometimes cannot well be reduced because of the effect on other roads. If relieved from recapture, Mr. Eastman said, the steel corporation might be able to deal more generously with the railroads in the matter of the price of steel rails, which has remained constant since 1923 while many other prices have come down. Similar figures were also given for the Pocahontas district coal roads, showing that the Chesapeake & Ohio in the period had paid $81,542,119 in dividends, while the Hocking Valley had paid $7,947,-142, the Norfolk & Western $134,521,985, and the Virginian $15,948,465. The Norfolk & Western had a capitalization of $252,000,000 in 1930 as compared with the commission's tentative valuation of $396,000,000. The tentative report shows excess earnings for it in all but three years of the period, while the estimate for the C. & O. shows an excess for each year except 1921 and 1922.

Mr. Eastman said that the figures submitted by S. T. Bledsoe showing the percentage earned by the railroads on the commission's tentative valuation plus later investment did not compare exactly with those of the commission and he submitted similar figures on three different bases.

To show the great difference between the railroads and the commission as to valuation, Mr. Eastman said that the R. F. & P. had claimed a total value of $62,-000,00 for a year as to which the commission fixed the value at $30,000,000. He said Commissioner E. I. Lewis would appear before the committee to discuss the question of the proposed repeal of the valuation act and to say that the commission should keep equipped with sufficient valuation data to be able to present an adequate defense.

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading in the week ended January 30 again showed a slight decrease as compared with the week before. The total was 561,-157 cars, which was 158,240 cars less than that for the corresponding week of last year and 337,678 cars less than that for 1930. Grain, livestock and coal showed slight increases as compared with the week before but other commodity classifications showed reductions. The summary, as compiled by the Car Service Division of the American Railway Association, follows:

Revenue Freight Car Loading

Week Ended Saturday, January 30, 1932

Districts	1932	1931	1930
Eastern	128,111	163,040	210,772
Allegheny	111,441	149,057	183,796
Pocahontas	34,035	43,083	59,683
Southern	87,285	113,546	132,583
Northwestern	64,822	87,107	109,471
Central Western	88,320	106,817	132,095
Southwestern	47,143	56,747	70,435
Total Western Districts	200,285	250,671	312,001
Total All Roads	561,157	719,397	898,835
Commodities			
Grain and Grain Products	32,982	42,528	44,601
Live Stock	21,225	23,221	28,094
Coal	108,161	141,704	210,532
Coke	5,205	8,898	12,443
Forest Products	18,971	36,023	48,477
Ore	2,816	5,635	7,682
Mdse L.C.L.	187,979	210,939	238,177
Miscellaneous	183,818	250,449	308,829
January 30	561,157	719,397	898,835
January 23	562,938	715,474	862,346
January 16	573,276	725,212	847,155
January 9	572,504	713,128	862,461
January 2	503,325	614,860	775,755
Cumulative total, 5 weeks	2,773,200	3,488,071	4,246,552

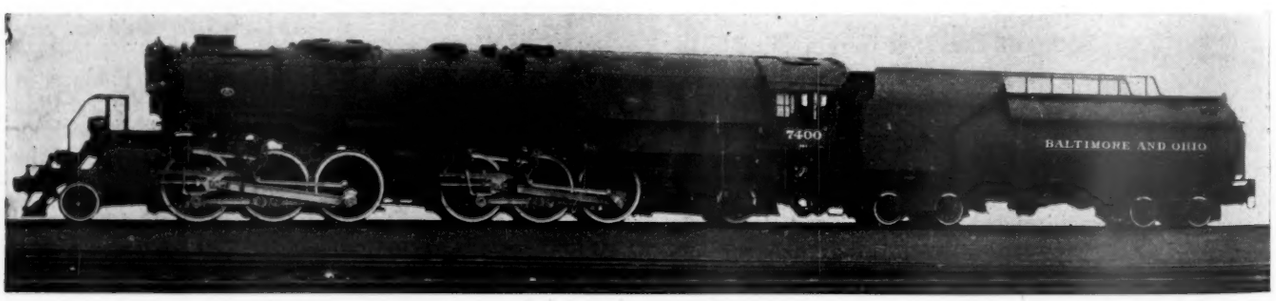
Car Loading in Canada

Car loadings for the week ended January 30, amounting to 40,875 cars, showed a seasonal increase over the previous week's of 621 cars. Grain was heavier by 404 cars, pulpwood by 100 cars, pulp and paper by 30 cars, other forest products by 254 cars, ore by 222 cars and merchandise by 95 cars. Compared with the fourth week in 1930, total loadings were lighter by 6,738 cars. All commodities except coal, other forest products and ore showed decreases.

The index numbers for total loadings in both the eastern and western divisions showed improvements, rising from 72.49 and 68.38 to 73.31 and 74.9, respectively.

	Total Cars Loaded	Total Cars Rec'd from Connections
Total for Canada		
January 30, 1932	40,875	20,519
January 23, 1932	40,254	20,081
January 16, 1932	39,784	20,046
January 24, 1931	47,613	27,837
Cumulative Totals for Canada		
January 30, 1932	159,697	80,127
January 24, 1931	175,043	101,498
January 25, 1930	210,711	135,934

* * * *



Baltimore & Ohio Single-Expansion Articulated Locomotive Built in January, 1931, by the Baldwin Locomotive Works—Equipped With the Emerson Water-Tube Firebox

Odds and Ends . . .

The Milwaukee's Safety Record

Again last year, the Chicago, Milwaukee, St. Paul & Pacific had a clear record in the matter of fatalities among passengers. During the last 14 years, only one passenger on a Milwaukee train has been fatally injured in a train accident.

Stretching the Maintenance Budget

There may be an idea in this one for the maintenance departments of railways which are having trouble in stretching the money they have available over all of the jobs which need to be done. According to the New York Times, the Long Island station at Bellmore, L. I., needed a coat of paint. When the railroad was slow in getting around to it, members of the Bellmore Exchange Club, led by its president, Police Justice George S. Johnston, decided to don overalls and to paint the station themselves.

A Long Engine Run in Africa

If it is good railroad practice in this country, it is good railroad practice anywhere in the world. The Rhodesia Railways are now running all their through trains, both passenger and freight, from Mafeking to Bulawayo, a distance of 490 miles, without changing engines. Relief enginemen are accommodated in a "caboose" which is hauled next to the engine. This car contains sleeping accommodations and cooking facilities. The trains are handled principally by 4-8-2 type locomotives, and the fastest run at present is that of the "Rhodesia Limited" which makes the 490-mile journey in 19 hrs. 40 min. In the reverse direction, the "Rhodesia Express" requires 20 hrs. 35 min. to complete the run.

Class-Consciousness in Siberia

The Trans-Siberian Railway, which is owned by the Soviet, formerly operated three express passenger trains weekly between Moscow and Harbin, each of which carried first, second and third class coaches. Now the schedule has been changed to provide for two express trains and one de luxe train which latter train carries only first-class passengers. No increases in fares or sleeping car charges are being made for this de luxe service, and there is no difference in the running schedule. However, additional comforts, such as radio receiving sets, games and better dining car service, are provided. The use of the dining car on the first-class train is also made optional, whereas formerly a charge was made for meals whether the dining car was patronized or not.

French Railways Have Their Troubles

Deficits are not peculiar to the railways in this country. The seven railroads of France, two of which are controlled directly by the state and the remainder of which are so closely regulated that it amounts to the same thing, had deficits in 1931 aggregating close to $120,000,000. The cumbersome state management comes in for the greater part of the blame for this situation. There is considerable outcry against the "severe" regulation in effect in France, which determines the rates and train services of the individual roads and also supervises matters concerning the personnel, construction of new lines, buildings, stations, materials and all technical operating problems. This does not sound like anything very unusual, however, to railroad men in this country who are accustomed to working under the eyes of the Interstate Commerce Commission and the various state regulatory bodies. Another shortcoming of the French system is said to be its failure to keep pace with the times. For example, large sums are wasted because of the antiquated regulations forcing the running of three trains daily on every branch line, although some of these trains are entirely empty of passengers. A large personnel, as well as considerable equipment, is used on lines through areas which ceased to be of any importance as long as 50 years ago.

"Paper" Railroad Is Torn Up

One of Colorado's railroads went out of business recently. During the 40 years of its existence, it set up a unique record. Not once did it suffer from broken rails or washouts and no train ever fell behind its schedule. As a matter of fact it never had any tracks and neither did it have any trains. Colorado's trainless and trackless railroad, the Cripple Creek & Colorado Springs, was organized back in the boom days when Cripple Creek was in all the headlines because of the gold strike. Early day capitalists, dreaming of the development of a great city at Cripple Creek, concluded that there was a splendid opportunity for the construction of railroads to haul ore from the area and to bring supplies into it. Several railroads were built, but the Cripple Creek & Colorado Springs was not one of them. It remained a "paper" railroad. It was finally dissolved, according to the petition filed by the company's attorney, to obviate the necessity of preparing annual reports.

Mourns "Good Old Days"

"When I first started braking," says Frank J. Dentler, passenger conductor on the Union Pacific, who recently retired after 50 years of service on a number of railroads, "a fellow had to know all ends of the game to get a job. The best way to catch on was to walk into the superintendent's office and say, 'I'm a first-class shack, but I can run your engine, conduct your train, fire your engine and, in a pinch, I can run the whole division.' That was back in the days of the wood-burners. If we ran out of fuel, we grabbed our axes and made for the nearest stand of timber. We usually left on time, but if we arrived at our destination on time that was unusual. Storms caused us more trouble than anything else. Many a time I've been on a train that was tied up in a snow blockade three or four days. During those periods we'd live on whatever the news butcher had in the way of peanuts and candy. Today being a conductor on a train is as tame as a hotel clerk's job. You have to have a voice with a smile and if the train is late, you have to spend a couple of weeks writing out reports. In the old days the only reports we ever made were on our cuffs."

The Best Talkers Won

Passenger agents on the Pacific Coast held an oratorical field day at Fresno, Cal., recently. The occasion was the meeting of the transportation committee of the Kiwanis Club, at which the decision was to be made concerning the routing of the Kiwanis special to the national convention of the organization to be held in Detroit, Mich., next summer. If reports from California are to be credited, there were not enough passenger agents in San Francisco on the day of the meeting at Fresno to make up a corporal's guard. The eastbound routing finally went to the Southern Pacific, the Denver & Rio Grande Western, the Chicago, Rock Island & Pacific and the Michigan Central. It was alleged by some of the losing representatives that the brand of oratory dispensed by the agents of the winning roads was what largely influenced the Kiwanis committee.

"It was this way," one of the good losers explained. "Lee Hudson (district passenger agent, Southern Pacific), who left his Oakland listening post to battle for the Southern Pacific, performed so well as an orator that he was in a class by himself. It was not necessary to wait for the vote. We could see just how it was. Fred Wagner (district passenger agent, Denver & Rio Grande Western) painted a picture of his company's service and the Royal Gorge that could not be excelled. Fred talked for an hour and he did so well that it seemed like three minutes. The Rock Island spellbinder followed with a wonderful oration, and then came Merwin Webb (Michigan Central). After the latter got well under way, the rest of us were simply ready to quit."

NEWS

Truck Subsidiary Must Charge Same As Railway

California commission so rules in case involving Pacific Motor Transport Co.

The Railroad Commission of California has ruled that a railroad should not transport freight through a subsidiary at rates less than those maintained by the railroad itself. The opinion was rendered in a complaint filed against the Pacific Motor Transport Company, a subsidiary of the Southern Pacific and the Pacific Electric, in which it is charged that the former company was organized in October, 1928, for the purpose of enabling the latter to drive out of business and cripple complainants and other certified carriers by auto truck. The action was brought by the Pioneer Express Company, the Valley Motor Lines, Inc., the United Motor Transport Lines, Inc., and the California Interurban Motor Transportation Association.

The majority opinion of the Railroad Commission holds that the parent companies, the Southern Pacific and the Pacific Electric, maintain, through the medium of the transport company, rates for the same or greater service which are in many instances less than the freight rates maintained between the same points by the parent companies. The decision says, "The device which the Southern Pacific and the Pacific Electric has established whereby they handle freight under two different sets of tariffs leads inevitably to discrimination and is obviously illegal under the Constitution and the Public Utilities Act of this state. The parent companies, the Southern Pacific and the Pacific Electric, should comply with the provisions of law above noted by revising their own tariffs or those of the transport company so that none of the transport company's rates applying between the same points would be less than those maintained directly by the rail carriers. In other words, the rail carriers should not maintain indirectly through the transport company schedules which offer the same or a greater service at rates less than those maintained by the Southern Pacific and the Pacific Electric."

The order itself, entered on February 1, commands that the Southern Pacific and the Pacific Electric shall within 40 days from the date of the order, cease and desist from applying, demanding or collecting for the transportation of freight between points on their lines, rates in excess of those contemporaneously maintained by the Pacific Motor Transport Company on like traffic for the same or a greater service. The decision further orders that the Pacific Motor Transport Company operations by truck between El Centro and Holtville, Santa Barbara and Montecito, and Los Angeles and Vernon shall be discontinued until the company has first obtained from the Railroad Commission a certificate of public convenience and necessity authorizing such operations; or until the corporation with whom the Pacific Motor Transport Company has contracted for such service has obtained such certificate.

Shippers' Board Meetings in March

The following Shippers' Regional Advisory Boards will hold meetings during March: The Southwest Shippers' Advisory Board on March 3 at Beaumont, Tex.; the Ohio Valley on March 15 at Columbus, Ohio; the New England on March 16 at Boston, Mass.; Trans-Missouri-Kansas on March 16 at Kansas City, Mo.; Great Lakes on March 23 at Toledo, Ohio; Atlantic States on March 24 at Newark, N. J.; Allegheny on March 24 at Pittsburgh, Pa., and the Southeast on March 31 at Chattanooga, Tenn.

At the Southwest meeting at Beaumont, Col. W. E. Talbot, agency manager of the Southland Life Insurance Company, will be the guest speaker, while R. S. Manley, president of the Texas Creosoting Company, will present a paper on motor transportation.

New York Railroad Club

At the January meeting of the New York Railroad Club, the resignation of Col. Douglas I. McKay, president, Standard Coupler Company, who, for the past two years has ably served the club as executive secretary, was accepted and the secretary's office has been combined with that of the treasurer, with the appointment of David W. Pye, president, Tuco Products Corporation, as secretary-treasurer for the remainder of the present administration.

Coincidentally, the club's headquarters have been moved from 26 Cortlandt street to Room 527, 30 Church street, New York.

At the next regular meeting of the club on Friday evening, February 19, in the auditorium of the Engineering Societies building, 29 West Thirty-Ninth street, John J. Mantell, who was appointed advisor to the Chinese Government for the purpose of studying railway systems throughout China, will discuss The Actual Railway and General Economic Situation in China, and will also discuss the systems of railroading as he observed them in India, Italy, France and England. In addition, motion pictures of scenes in China and India will be shown.

Net Income for 1931 Totals 1.98 Per Cent

Year's return compares with 3.36 per cent in 1930—Gross down one-fifth

Class I railroads in 1931 had a net railway operating income of $531,095,960, which was a return of 1.98 per cent on their property investment, according to complete reports for the year compiled by the Bureau of Railway Economics. In 1930 it was $884,856,141 or 3.36 per cent. Compared with a reduction in 1931 of nearly 20 per cent under 1930 in the volume of freight, there was a decrease of 20.7 per cent in gross revenues and a decrease of nearly 18 per cent in operating expenses. Passenger traffic was the smallest for any year since 1904; gross revenues being $551,054,239, a decrease of $178,565,065, or 24.5 per cent, compared with 1930.

Total operating revenues amounted to $4,236,587,351, compared with $5,343,665,635 in 1930, a decrease of 20.7 per cent; operating expenses totaled $3,265,662,354, compared with $3,976,605,062 in 1930, a decrease of 17.9 per cent.

Class I railroads in 1931 paid $307,707,254 in taxes, a decrease of $45,854,536, or 13 per cent under the total for 1930.

Forty-one Class I railroads operated at a loss in 1931, of which 14 were in the Eastern district, 8 in the Southern and 19 in the Western.

For December, the net railway operating income amounted to $21,263,164, which was at the annual rate of return of 1.29 per cent. In December, 1930, the net was $49,330,478, or 3.06 per cent. Total operating revenues for December amounted to $288,631,424, compared with $377,958,233, in December, 1930, or a decrease of 23.6 per cent; operating expenses were $241,439,258 compared with $397,961,977, or a decrease of 19 per cent.

Net railway operating income for the Class I railroads in the Eastern district in the year 1931 totaled $277,215,330, which was at the rate of 2.26 per cent; the same figure in 1930 was $447,765,546 or 3.75 per cent. Operating revenues in 1931 were $2,122,214,066, a decrease of 20.3 per cent below 1930; operating expenses, $1,630,727,212, a decrease of 17.8 per cent; December net income was $14,165,125, compared with $22,159,999 in December, 1930.

Railroads in the Southern district had a net income of $44,657,073; (1.34 per cent) in 1930, the net was $88,924,747, (2.68 per cent). Operating revenues

(Continued on page 301)

J. L. Eysmans Decries Rate Change Delays

P. R. R. traffic executive says changes on railroad take 60 days, trucks 60 minutes

Julien L. Eysmans, traffic vice-president of the Pennsylvania, in an address at Pittsburgh, Pa., on February 4, emphasized the necessity for changes—and rapid ones—in the railroad freight rate structure.

"The volume of tonnage which is now moving over the unregulated waterways and by highway trucking has reached gigantic proportions," he said. "It has reintroduced into present day commerce those very elements of uncertainty and discrimination which the public years ago succeeded in eradicating in the case of railroad rates. The public is already demanding, and eventually will succeed in obtaining, equality for all in the rates and practices of the carriers which are now unregulated. This can only be accomplished by extending regulation to cover transportation by highway and waterway.

"We cannot, however, contemplate the future without a feeling of anxiety over what is to become of our present railroad rate structure. There is every indication that the present scheme of rates, which is the result of so many years of study and experience, must again undergo radical changes. Come what will in that direction, we will find some satisfactory way of solving the problem.

"The present difficulty of the railroads is not only with the problem of designing rates to meet truck and water competition, but the length of time it requires them to knead and bake a new rate. At present the minimum time is about sixty days, whereas the unregulated competitors do the same job in about sixty minutes, to say nothing of the complexity of railroad tariffs in expressing rates, rules and regulations, versus the simplicity of transacting such matters with unregulated carriers.

"It is plain to be seen that until all methods of transportation can be regulated alike as to publication of tariffs, the law requiring the railroads to give thirty days notice of changes in rates should be modified to require the giving of only five days notice, at least in the case of reductions to meet water or truck competition. The original law of 1887 required no advance notice for reductions in rates. In 1889 this was changed to require three days notice for increases in rates, and in 1906 it was changed to the present requirement of thirty days.

"All phases of competition of the common enemy are being analyzed and remedial measures are gradually being inaugurated which it is believed will enable the railroads to cope successfully with the situation. This applies both as to speed and rates. As to the latter, in some cases it is necessary to reduce carload minimum weights without increasing rates; in others to increase minimum weights and reduce the rates, while still other situations require straight out and out reductions. In fact it may become necessary to establish factors for 10,000 pounds, or even as low as 6,000 pounds, coupled with more generous privileges as to mixture of commodities."

I.C.C. Examiner Recommends Approval of Inter-station Trucking in Chicago

Examiner R. N. Trezise of the Interstate Commerce Commission, in a proposed report made public on February 6, recommends that the commission approve the tariff filed by the Chicago railroads in September proposing to authorize the substitution of highway motor vehicle service in lieu of switching service between stations of terminal roads in the Chicago district. The record indicates, he says, that similar terminal services between freight stations of the various roads have been performed by wagon and truck in recent years without any tariff publication as an economical and desirable operating practice, without any question as to its legality; that no tariff provisions were thought necessary but that the suspended schedule was filed as the result of conferences with commission officials. Respondents should promptly file with the commission, he says, copies of the contracts between the line-haul carriers and the so-called switching lines when employed to perform the highway vehicle service.

Railroad Credit Corporation

The Railroad Credit Corporation, formed by the railroads for the purpose of collecting, receiving and administering, through loans to needy rail carriers, funds growing out of the emergency increase in freight rates allowed by the Interstate Commerce Commission, has announced the following permanent organization:

President, E. G. Buckland, chairman of the board of the New York, New Haven & Hartford, New Haven, Conn.; vice-president and comptroller, E. R. Woodson, since 1914 secretary and treasurer of the Railway Accounting Officers' Association, Washington, D. C.; secretary, William J. Kane, formerly connected with the Car Service Division of the American Railway Association and now a practising attorney, Washington; assistant secretary, M. K. Dugan, assistant to Mr. Buckland, New Haven; treasurer, Arthur B. Chapin, formerly president of the American Trust Company, Boston, Mass., and later general manager of the New York office of the Whiting Paper Company of Holyoke, Mass., Boston; counsel, Daniel Willard, Jr., assistant to the general counsel of the Baltimore & Ohio and secretary of the Railroad Credit Corporation during the period of its organization, Baltimore, Md. All officers of the corporation will retain their present business connections.

The principal administrative offices of the corporation are located in the Transportation building, Seventeenth and H Streets, N. W., Washington, while an additional office will be maintained at Room 3040, Grand Central Station, New York.

Highway Regulation Sentiment Growing

Committee hearings on Couzens bill reveal more favorable attitude in Congress

Hearings before the Senate committee on interstate commerce on Senator Couzens' bill for the regulation of motor transportation have brought out indications of a growing sentiment in Congress in favor of some regulation of both bus and truck transportation. A little earlier in the session there was a general belief that Congress would not be able to reach an agreement on the subject at this session and it was understood that Senator Couzens himself had introduced his bill and instituted hearings on it more for the purpose of sounding out opinion than to obtain action at this time; but some of the witnesses who testified before the committee last week in opposition to any regulation of trucks, declaring that there is no public demand for it, found that some of the senators had been hearing from the public on the subject; and there are indications of opinion among members of Congress who are not on the committee that motor transportation is bringing about a chaotic situation which is also subjecting the railroads to unfair competition under the present conditions of discriminatory regulation.

During the early days of the hearing Senator Couzens indicated a belief that perhaps more information should be obtained through the establishment of a permit system for trucks before any effort is made to regulate them very extensively, but as the hearing progressed some of the truck operators themselves expressed a willingness to undergo regulation provided it is extended to contract carriers and to trucks operated by railroad subsidiaries. When witnesses urged that Congress leave the question of truck regulation to the states, members of the committee quickly pointed out that many of the conditions now complained of have persisted under state laws which have not been enforced.

After Examiner Leo J. Flynn of the Interstate Commerce Commission had testified before the committee as to some of the facts in the situation developed by the commission's investigation, witnesses were heard representing the National Automobile Chamber of Commerce, the National Industrial Traffic League, and officers of various companies operating motor vehicles both as common carriers and as contract carriers. Although there was general agreement that there should be some federal regulation of bus transportation, argument against extending regulation of freight transportation were based on the unorganized state of the industry and the difficulty of regulating a business so largely conducted by individuals. When LaRue Brown, general counsel of the N. A. C. C., told the committee that there is no public demand for truck regulation, Senator Couzens reminded him that millions of automobile owners are getting tired of having the

highways blocked with trucks and buses and are demanding some consideration for themselves. Most of the motor vehicle operators who testified pointed to the increasing percentage of their earnings that is being consumed in taxes of various kinds.

R. C. Fulbright, chairman of the legislative committee of the National Industrial Traffic League, expressed the opinion that railroads should be permitted to operate lines of motor trucks for hire but that such operations should be conducted by subsidiary or separate companies and should not be carried into the accounts of railroad operations, as shippers would look with disfavor upon any law that would permit railroads to pass the burden of unprofitable motor truck operations to shippers by railroad. The league is of the opinion, he said, that under present conditions there should be no federal legislation undertaking to regulate the rates of interstate motor truck operators nor requiring that certificates or permits be obtained before operators are permitted to transport freight by motor truck for hire either as contract or common carriers. The league favors the development of uniform codes among the several states to govern the operations of motor carriers and commends the efforts now being made to bring about uniform regulations and better enforcement. There should be further study of truck operations before legislation is attempted, and he recommended that Congress obtain facts through the Bureau of Public Roads rather than by the commission. A statement by Mr. Fulbright that he was willing that truck operations of the railroads go unregulated except by competition brought an emphatic retort from Senator Couzens that he disagreed with that view. Senator Couzens has also made several remarks indicating an opinion that the railroads might well be relieved of some of the details of regulation. On Monday the hearings were adjourned for several days while some amendments to the Couzens bill are being prepared.

North Western Suburban Traffic Off

The Chicago & North Western, during 1931, carried a total of 19,788,197 passengers in its Chicago suburban service, as compared with 22,147,158 in 1930 and 22,424,728 in 1929.

N. & W. Reduces Wages

Following the successful termination of the conferences recently held at Chicago, at which representatives of the organized railway employees of the nation voluntarily agreed to accept a wage cut of 10 per cent, the compensation of all officers and employees of the Norfolk & Western was reduced by 10 per cent on February 1. The reduction does not affect pensioners.

Wage Statistics For November

Class I railways reported to the Interstate Commerce Commission a total of 1,169,207 employees as of the middle of November and a total compensation for the month of $155,490,976. Compared with the returns for the corresponding month of 1930 this shows a decrease in the number of employees of 225,194 or 16.15 per cent. The total compensation shows a decrease of $38,441,522, or 19.82 per cent.

S. P. & S. Organizes Land Settlement and Immigration Department

The Spokane, Portland & Seattle has organized a department to handle land settlement and immigration, the department being consolidated with the agricultural and livestock activities of the company under Kenneth C. Miller, agricultural and livestock agent. The new department will develop local contacts and handle inquiries received through its own organization and through its parent lines, the Great Northern and the Northern Pacific. Heretofore such inquiries have been referred to the Oregon State Chamber of Commerce.

Merchants and Waterways

The Merchants' Association has written to President Hoover opposing his plan for the development of the St. Lawrence waterway, now under negotiation with Canada. There is nothing surprising about this attitude. New York's commercial interests have looked askance at the northern waterway, for fear lest it divert freight from this port. Members of the State delegation in the House of Representatives have often expressed their preference for the so-called "All-American Route," dug nearer home. But if the merchants are right in their contention that the St. Lawrence project should be abandoned because of its cost, the all-American route, likely to prove two or three times as expensive, should not even be considered—unless New York is willing to pay the price, in addition to the hundreds of millions it has already sunk in the Erie Canal, for insurance against possible Canadian competition.

The belief has been expressed in some "quasi-official circles," according to the merchants' committee, "that a proportion of the estimated cost [of the St. Lawrence undertaking] may eventually be realized by the sale of power," developed as a by-product of the seaway. But the members of the committee "doubt that the proposed power development can even be made self-supporting." Now, it so happens that among the "quasi-official circles" which have made the statement referred to are the United States St. Lawrence Commission, of which Herbert Hoover was once chairman, and the St. Lawrence Power Authority of which Franklin D. Roosevelt is the chief sponsor. If the power project cannot be made self-sustaining in partnership with Federal concern for navigation, what will become of it if the waterway is abandoned and all the expense of the dams and pools is left to be borne by power alone?

—From the New York Times.

H. A. Kidder Heads United Engineering Trustees

Harry A. Kidder, superintendent of motive power of the Interborough Rapid Transit Company, New York, has been elected president of the United Engineering Trustees for the year 1932. Harold V. Coes, consulting management engineer of Ford, Bacon & Davis, has been elected a vice-president and among the new directors chosen is F. A. Schaff, president of the Superheater Company, New York.

I.C.C. Inquires About Crane Service

The Interstate Commerce Commission has addressed to 19 eastern railroads a questionnaire calling for detailed information relating to the furnishing of crane and derrick services for the loading and unloading of freight, including references to tariffs and the question as to whether a charge is assessed for such service in addition to the line-haul rates. This inquiry is being made in connection with the commission's investigation undertaken when it recently suspended a tariff filed by the Pennsylvania offering such service. It is understood the commission has been informed that some roads are furnishing such service without tariff provision.

New Type Pullman on B. & O.

A new "private section" Pullman sleeping car has been placed in service on the Capitol Limited of the Baltimore & Ohio between Washington and Chicago. The innovation provides space between the berth and the curtain so that the passenger can stand erect while undressing. Curtains may be drawn to give privacy in the daytime also, if desired. Each section has individual heating and ventilating, its own lavatory, clothes-hangers, vacuum bottle and electric fan. Smoking is permitted. There are four of these private sections and ten regular sections in the car. Seats in all sections are adjustable.

Western Grain Rate Case Re-Opened

A re-opening of the western grain rate case, in which a general revision of rates on grain and grain products ordered by the Interstate Commerce Commission was recently set aside by a decision of the Supreme Court of the United States, was announced on February 8 by the commission. The case is to be re-opened solely on the general question of changed conditions affecting grain and grain products and the transportation thereof since the termination of the hearings in the case on September 22, 1928, because the court had ordered the issuance of an injunction against the commission's order on the ground that it had denied a rehearing asked by the carriers in view of the

changed conditions. The commission has recently authorized the railroads to re-establish the old rates in effect July 31, 1931. In view of the comprehensive record which has already been made, and to avoid undue expense, the commission expresses the desire that the presentation of evidence of a purely cumulative character be avoided.

F. J. Sprague Honored By Electrical Engineers

Frank J. Sprague was made an honorary member of the American Institute of Electrical Engineers at the recent mid-winter meeting of that association. Mr. Sprague was a pioneer in the field of electric traction having installed the first trolley system used in the United States at Richmond, Va., in 1887. He invented multiple-unit control for electric cars and locomotives and developed a system of regeneration such as is now used on heavy-grade electrified railroads for braking and returning power to the line. A system of automatic train control is another one of Mr. Sprague's developments. He is also widely known for his extensive work with electric elevators.

Petition to Postpone Depreciation Order

Postponement for at least a year of the effective dates of the Interstate Commerce Commission's order requiring the railroads to institute a system of depreciation accounting on January 1, 1933, is asked in a petition filed with the commission by the Presidents' Conference Committee on Federal Valuation of the Railroads. The order also requires the roads to file by September 1 estimates of percentage depreciation rates to be applied to the ledger values of the various classes of property. According to the petition, the order makes "such a radical change in present methods of accounting" that the effect on the operating expenses and income are not known and that the roads have not been able to give adequate consideration to the probable results because the order was issued in the midst of a severe and unusual financial depression requiring their undivided attention. They have not formulated any policy or reached an agreement among themselves on a position regarding the order, or its validity; and the information necessary to make the order effective is not available and cannot be made available prior to the proposed effective dates without substantially increasing the operating expenses in a way that should not be required of them at this time.

D'Esposito Proposes New Terminal Plan for Chicago

Another plan for the consolidation of the railroad freight and passenger terminals now located in the area immediately south of the Chicago business district has been proposed by Joshua D'Esposito, consulting engineer at Chicago and formerly chief engineer in charge of the construction of the Chicago Union Station. Mr. D'Esposito proposes the construction of a passenger terminal to face north on Roosevelt Road (Twelfth street) between Clark and State streets, with a union freight terminal directly west of the passenger station and extending to the Chicago river. The new terminal, which would cost between 30 and 60 million dollars according to Mr. D'Esposito, would be occupied by all the roads now using the La Salle Street, Grand Central and Dearborn stations.

According to the plan, the station would be connected by an underground passage with the passenger station of the Illinois Central and would be served by the proposed State Street subway and by a diagonal drive to extend northwest from the station to a connection with a proposed extension of Wacker drive at Van Buren street.

Mr. D'Esposito suggests that the railroads sell their property north of Roosevelt road and east of the river to a banking syndicate, the proceeds of which sale, he contends, would largely defray the cost of the project.

The C. N. R. in 1931

Total operating revenues of the Canadian National for the year 1931 approximated $177,273,700 as compared with $221,770,445 for the year 1930, a decrease of $44,496,745, or 20 per cent. Operating expenses were $169,688,000 as compared with $195,259,507 for 1930, a decrease of $25,571,507, or 13 per cent. Net operating revenues for 1931 will be close to $7,585,700, as compared with $26,510,938 for 1930, a decrease of $18,925,238.

These figures cover all lines comprised in the system, with the exception of the lines east of Levis, P. Q., and Diamond Junction, which are operated under the provisions of the Maritime Freight Rates (subsidy) Act.

Earnings in 1931 were the lowest of any year since the present system came into existence but operating economies considerably offset the severe shrinkage in business. While revenue from freight traffic decreased by approximately 16 per cent, gross tons per train was slightly increased. Speed was increased and fuel consumption decreased. Loadings of grain and grain products decreased 3½ per cent and the only listed commodity carried by the railway to show an increase during the year was coke. Freight revenue in 1931 was 39 per cent below that of 1928.

In passenger revenue there was a decrease of approximately 28 per cent as compared with 1930. The situation necessitated drastic cuts in train service, and passenger train mileage operated in December, 1931, was 25 per cent less than in the corresponding month of 1930 and 29 per cent less than in December, 1928.

Wage Reduction in Canada

Weeks of negotiation between officers of the two principal Canadian railways and representatives of train and engine service employees and operators ended last week in Montreal in the signing of an agreement, under which the ten per cent wage cut instituted by the companies as from November 16, 1931, is to remain in force until January 31, 1933, but is made to date only from December 1, 1931, instead of from November 16.

The agreement reads in part as follows:

"Agreement between the Canadian National Railway Company and the Canadian Pacific Railway Company, respectively, and their locomotive engineers, locomotive firemen, conductors, trainmen, yardmen and telegraphers, respectively, made at the City of Montreal on the fourth day of February, 1932:

"The parties hereto agree to give effect, in principle, to the recommendation of the Board of Conciliation and Investigation, in its report to the Minister of Labor, dated November 30, 1931, to the extent that—

(a) Ten per cent shall be deducted from each employee's pay check;

(b) Basic rates of pay, as specified in the various schedules, shall remain in effect;

(c) This agreement shall be effective from December 1, 1931, to January 31, 1933, but if, on or after December 1, 1932, business conditions have not so improved as to enable the railways to terminate the agreement at January 31, 1933, notice to that effect will be given to the representatives of the employees, upon which the parties to this agreement will confer further and agree to make every reasonable effort to bring the matter to a conclusion before January 31, 1933."

Procedure Announced as to Loans from Finance Corporation

Information for those desiring to apply for loans from the Reconstruction Finance Corporation under the act recently passed by Congress has been issued in the form of a circular giving detailed instructions as to the information which must accompany such applications. Regional loan agencies have been designated in 17 cities. Interest rates will be determined from time to time by the board of directors of the corporation. A resolution authorizing the application and loan must be adopted by the board of directors of the applicant and the application, exhibits and collateral submitted to counsel for applicant and his opinion obtained in the form prepared by the corporation.

Special information pertaining to railway loans is included in the circular, which points out that loans must have the approval of the Interstate Commerce Commission, may not exceed three years, and may not be made for the purpose of initiating, setting on foot, or financing any enterprise not initiated, set on foot, or undertaken prior to January 22, 1932. Loans to any one railroad corporation and its subsidiary and affiliated organizations may not exceed at any one time $100,000,000.

No special form of application is required but three copies are to be delivered to the corporation and six to the Interstate Commerce Commission. A large volume of information is required, including a statement whether the applicant can secure the necessary funds in whole or in part from any other source and, if so, on what terms. If not the efforts which have been made and the

reasons for this situation should be stated, with full details of all negotiations undertaken. The purpose of the loan and the uses to which it will be applied, and the date or dates on which the funds must be available, are also requested. Other information called for includes the latest valuation placed by the Interstate Commerce Commission upon applicant's property, status of financial relations with the United States under the federal control and transportation acts, whether applicant is a party to the Railroad Credit Corporation plan and whether it has applied for or received loans from that corporation, estimates of receipts from the rate increase in Ex Parte No. 103, and a long list of details as to the company's financial structure and status, and its revenues, expenses, etc., including a carefully prepared monthly forecast for 1932. Applicants are required to state whether any individual, association, or corporation holds control, as trustee or otherwise, over the applicant, and, if so, the name of the individual or trustee, the name of the beneficiary or beneficiaries, and the purpose of the trust.

Piedmont & Northern Wins Income Tax Suit

In a federal court opinion filed in the United States district court at Charleston, S. C., on February 2, the South Carolina tax commission was restrained from collecting from the Piedmont & Northern, a South Carolina corporation, the sum of $35,426 assessed against that railroad as additional income taxes for the years 1926, 1927, 1928 and 1929.

The Piedmont & Northern operates two entirely disconnected lines, one completely within South Carolina and the other completely within North Carolina; these lines are operated separately except for certain general administrative expenses. During the years in question, the railway paid taxes under a South Carolina statute, on the entire net income, whether derived from interstate or intrastate commerce, of its line in that state, but paid no such taxes on the income of its North Carolina property. The tax commission contended that taxes should be based on income from intrastate traffic on the South Carolina road, plus a mileage proportion of the combined net income from interstate commerce on both roads, a basis which resulted in a higher total assessment.

Without passing upon the constitutionality of the South Carolina income tax law or of the commission's action, the court, in granting the railroad an injunction to prevent the commission from collecting the additional taxes, said, in part:

> The defendants contend that as the complainant is a South Carolina corporation the state has a right to levy an income tax upon its entire net income whether derived from interstate commerce or not. The complainant contends that the statute when properly construed does not authorize the imposition of the tax on any part of the revenue of the line lying entirely beyond the state and not as a part of a system with a line within the state. * * * No reason can be imagined why the income earned by railroads without the state should be subjected to taxation, which would not apply with equal force to out-of-state income of other domestic corporations. A serious question is presented as to whether the action of the commission does not constitute an unconstitutional discrimination against interstate commerce. * * * The act must be construed as a whole and when so construed we think it was clearly the intention of the legislature not to tax the income of corporations derived from a business carried on entirely outside the state.

Research Graduate Assistantships at the University of Illinois

To assist in the conduct of engineering research, the University of Illinois maintains, at its Engineering Experiment Station, 14 research graduate assistantships, for each of which there is an annual stipend of $600, plus freedom from most university fees. These assistantships are open to graduates of approved American and foreign universities and technical schools who are prepared to undertake graduate study in engineering, physics or applied chemistry. An appointment to one of them must be accepted for two consecutive collegiate years, half of this time being devoted to research and the remainder to study. Nominations, accompanied by assignments to departments of the experiment station, are made from applications received by the director each year not later than April 1, and are based upon character, attainments, and promise of success in the line to which the candidate proposes to devote himself, while preference is given to those applicants who have had some practical engineering experience following the completion of undergraduate work.

Research work and study may be undertaken in architecture, architectural engineering, ceramic engineering, chemistry, civil engineering, electrical engineering, mechanical engineering, mining engineering, municipal and sanitary engineering, physics, railway engineering, and theoretical and applied mechanics.

Additional information may be obtained by addressing the Director, Engineering Experiment Station, University of Illinois, Urbana, Ill.

Court Criticizes I.C.C. Valuation

A new doubt as to the validity of the final valuations issued by the Interstate Commerce Commission under its primary valuation program, which were all described by the commission as being "for rate-making purposes," has been created by a recent decision of the court of appeals of the District of Columbia on the appeal taken by the New York, New Haven & Hartford from the decision of the Supreme court of the District of Columbia, which had denied its petition for a writ of mandamus directing the commission to assign a value to the New Haven's rights in the Grand Central Terminal property in New York and its similar rights in the South Station property in Boston. In directing the issuance of the mandamus the court of appeals said:

"Nowhere in the act is there anything that either expressly or by inference can be distorted into a limitation of this valuation for rate-making purposes. The statute, on the contrary, provides that it shall be a valuation of all the property of the railway company. We must not be understood as holding that the valuation of the New Haven property fixed by the commission is not a proper valuation for rate-making purposes. This is not a matter we are called upon to decide. The statute requires a valuation of all the property 'owned or used' by the carrier, which shall be prima facie evidence for any and all purposes specified in the act and not merely for the purpose of establishing a rate base."

The commission in its valuations, in order to avoid duplications in using the aggregate valuations as a rate base, had attempted to refrain from including property in which carriers had a joint interest in more than one valuation.

Activity Results from Wage Cut

That the acceptance by railroad employees of a 10 per cent reduction in wages will stimulate business is reflected in the reaction that is already taking place and by the manner in which several railroads have stated publicly that they will utilize the amount saved as a result of the reduction. On February 2 the Chicago & North Western announced that 500 men will be put to work in its locomotive shops at Chicago. Fred W. Sargent, president of the North Western, estimates that the 10 per cent wage reduction will save the road around $6,000,000 annually. While the carrier will report a substantial deficit after charges for 1931, Mr. Sargent believes prospects for 1932 are sufficiently bright to warrant spending a portion of the saving on maintenance of equipment. With revenues improved, it is believed shops at other points on the system will be reopened.

P. H. Joyce, president of the Chicago Great Western, states that the financial condition of that road is such as to permit the expenditure of the entire $500,000 saved by the wage reduction for maintenance work. The road is entering 1932, Mr. Joyce said, in good condition physically and with no need for heavy outlay of funds for improvement of the property. Maintenance schedules this year will be directed largely to keeping the road up to its average standard.

The Union Pacific, which will save about $6,000,000 in wages, will also use a large part of this amount in carrying out its maintenance program.

James E. Gorman, president of the Chicago, Rock Island & Pacific, in commenting upon the effect of the $215,000,000 wage reduction in stimulating business, said: "There will be a lot of money spent. Anyone can run a better railroad with funds to purchase adequate equipment than he could otherwise. More should be spent for maintenance and in other directions. There is not much likelihood of new car buying, as the reduction in traffic has left the roads with more cars than they need. In other directions, however, there should be improvement."

Some sources estimate that 100,000 men will be put back to work in the shops and the maintenance of way departments during the year. H. E. Newcomet, vice-pres-

ident of the Pennsylvania, believes that increases in expenditures by railroads will be gradual. "I think," he said, "it will be two or three months before the railroads start doing much in the way of opening shops, purchasing equipment and increasing outlay for maintenance of property. I believe railroad managements will wait until conditions are adjusted and business more stabilized." The Pennsylvania also plans to borrow $5,000,000 a month from the Reconstruction Finance Corporation to continue electrification work in the east and employ about 20,000 additional men. "Every penny requested from the finance corporation will be utilized for the purpose of giving employment and ordering materials from the various industries," Gen. W. W. Atterbury, president, said. "The company will make its own arrangements to meet maturities and any other obligations which may arise during the year." The cost of the entire program of electrification of lines and terminals has been estimated at $175,000,000.

The Atchison, Topeka & Santa Fe states that the company will probably expend between $12,000,000 and $13,000,000 during the year for capital expenditures, such as additions, betterments and improvements. In addition the road expects to continue the construction of the new line from Boise City, Okla., to Las Animas, Colo., providing a new short route from the Texas Panhandle to the Colorado gateway.

Paul Shoup, president of the Southern Pacific, has announced that his road will place orders for 20,000 tons of rails and also will go into the market for a substantial order for ties, which should aid in reviving the lumber industry in that section of the country.

The settlement of the Canadian railroad wage dispute, under which employees of the Dominion lines agreed to accept a pay cut similar to that of the unions in this country, is expected to have a stimulating influence on trade and employment in that country. The Canadian rail unions agreed to accept a 10 per cent wage cut from December 1, 1931, until January 31, 1933.

The Beech Grove locomotive shops of the Cleveland, Cincinnati, Chicago & St. Louis at Indianapolis, Ind., will resume operations on February 15 with a force of 1,200 men, while the car repair and building shops will resume operations later. On February 15 the Collinwood locomotive shop of the New York Central at Cleveland, Ohio, will recall 1,100 men to work on repairs.

Net Income for 1931 Totals 1.98 Per Cent

(*Continued from page 296*)

were $517,344,511, a decrease of 19.6 per cent under 1930; operating expenses, $125,661,591, a decrease of 15.6 per cent, and December net income $3,678,196. against $8,824,537 in 1930.

The Western district in 1931 had a net of $209,223,557, (1.86 per cent). The 1930 net was $348,165,848, (3.14 per cent). Operating revenues totaled $1,597,028,774, a decrease of 21.7 per cent; operating expenses, $1,209,273,551, a decrease of 18.7 per cent; net income for the month of December was $3,419,843, compared to $18,345,942 in December, 1930.

CLASS I RAILROADS—UNITED STATES

	1931	1930
Month of December		
Total operating revenues	$288,631,424	$377,958,233
Total operating expenses	241,439,258	297,961,977
Taxes	16,205,826	20,131,703
Net railway operating income	21,263,164	49,330,478
Rate of return on property investment	1.29%	3.06%
Operating ratio —per cent	83.65	78.83
Twelve months ended December 31		
Total operating revenues	$4,236,587,351	$5,343,665,635
Total operating expenses	3,265,662,354	3,976,605,062
Taxes	307,707,254	353,561,790
Net railway operating income	531,095,960	884,856,141
Operating ratio —per cent	77.08	74.42
Rate of return on property investment	1.98%	3.36%

Chicago Offices of Passenger Associations Merged

The Transcontinental and the Western passenger associations headquarters in Chicago will be operated jointly after March 1, with H. W. Siddall, chairman of the Transcontinental, as chairman, and T. Thompson, chairman of the Western, as assistant to the chairman of the combined organizations. Each is to be operated as a separate unit under one head.

H. W. Siddall

This change has been made as a measure of economy. Under the new arrangement, there will be no change in the articles or by-laws of either association; headquarters of both will be located in the Union Station, Chicago.

Mr. Siddall was born on April 1, 1885, at Evanston, Ill., and began railway work at the age of 13 years in the passenger department of the Chicago, Milwaukee, St. Paul & Pacific, at Chicago. He continued with that railroad in various capacities, including that of passenger rate clerk, until 1918 when he became connected with the passenger section of the Division of Traffic of the United States Railroad Administration at Washington, D. C. At the close of federal control in 1920, Mr. Siddall returned to the Milwaukee, later in the same year being appointed secretary of the Transcontinental Passenger Association. On January 1, 1929, he was appointed chairman, to succeed E. L. Bevington, deceased.

Mr. Thompson was born in Chicago and began his railway work as an office boy in the general freight department of

Thomas Thompson

the Chicago & North Western at Chicago in 1879. He held various positions with this road and the Chicago, Milwaukee, St. Paul & Pacific until February, 1885, when he was appointed secretary of the Western Passenger Association upon its organization. From 1885 until September, 1926, he served as secretary under seven different chairmen of the association On the latter date he was appointed chairman of the Western Passenger Association to succeed Eben E. MacLeod, deceased.

When Is An Engine Out of Service?—Supreme Court Decides

A laborer of the New York, New Haven & Hartford, working at the roundhouse at Maybrook, N. Y., sued in the New York courts under the Federal Employers' Liability Act for injuries received by the negligence of his foreman while helping to move two driving wheels. The locomotive to which the wheels belonged was used exclusively in interstate commerce. The plaintiff recovered a judgment, which was affirmed by the New York Appellate Division and the Court of Appeals. 232 App. Div. 840; 256 N. Y. 427. The conclusion of the state court was that the nature and purpose of the plant warranted characterization of the plaintiff's work, of whatever nature, as in interstate commerce.

The Supreme Court of the United States, reversing the judgment of the state court, holds that the test applied by that court was broader than is justified by the decisions of the Federal Supreme Court. It says: "All work performed in railroad employment may, in a sense, be said to be necessary to the operation of the road. The business could not be conducted without repair

shop employees, clerks, janitors, mechanics, and those who operate all manner of appliances not directly or intimately concerned with interstate transportation as such, or with facilities actually used therein. But we have held that the mere fact of employment does not bring such employees within the Act. D. L. & W. v. Yurkonis, 238 U. S. 439; C. B. & Q. v. Harrington, 241 U. S. 177; Illinois Central v. Consines, 241 U. S. 188, 192; Industrial Acc. Comm. v. Davis, 259 U. S. 182, 187; Chicago & N. W. v. Bolle (decided Nov. 23, 1931).

"The criterion of applicability of the statute is the employee's occupation, at the time of his injury, in interstate transportation, or work so closely related thereto as to be practically a part of it. Thanks v. D. L. & W. 239 U. S. 556, 558; Chicago & E. I. v. Industrial Comm. (decided January 4, 1932). Under the circumstances of this case, whether respondent is within the Act must be decided not by reference to the kind of plant in which he worked, or the character of labor he usually performed, but by determining whether the locomotive in question was, at the time of the accident, in use in interstate transportation or had been taken out of it. The length of the period during which the locomotive was withdrawn from service [12 days; injury occurred on ninth day] and the extent of the repairs [journals turned, staybolts taken out and other items] bring the case within the principle announced in Industrial Acc. Comm. v. Davis, supra, and Minneapolis & St. Louis v. Winters, 242 U. S. 353; stamp the engine as no longer an instrumentality of or intimately connected with interstate activity, and distinguish such cases as New York Central v. Marcone, 281 U. S. 345, where the injured employee was oiling a locomotive which had shortly before entered the roundhouse after completing an interstate run.

"Respondent (plaintiff) endeavors to support the claim that here the instrumentality had not been taken out of interstate commerce by reference to the practice of petitioner, which is that work, sometimes greater and often less in amount than in this case, is done at Maybrook in connection with the monthly boiler-wash; whereas after a locomotive has run 35,000 miles, or eighteen months, it is marked for out-of-service repairs and is sent to the general repair shop at Readville, Mass. The argument is that the railroad company thus recognizes that such work as is done at Maybrook in conjunction with boiler-washing is incidental and does not take the engine out of service.

"We do not think this custom warrants a disregard of the proved facts, and the adoption of an artificial classification of the locomotive as one in service at the time of respondent's injury. The judgment must be reversed and the cause remanded for further proceedings not inconsistent with this opinion."

N. Y., N. H. & H. v. Bezue. Decided January 25, 1932. Opinion by Mr. Justice Roberts.

Equipment and Supplies

IRON & STEEL

THE SOUTHERN PACIFIC is inquiring for 20,000 tons of rail.

THE NORFOLK & WESTERN has placed a contract for 2,500 tons of plates, shapes and bars, for its first quarter requirements, with the Carnegie Steel Company.

THE INTERBOROUGH RAPID TRANSIT COMPANY has ordered 7,500 tons of rail from the Bethlehem Steel Company. About two-thirds of this will be 100-lb. rail for use on subway lines and the other third 90-lb. rail for elevated lines.

SIGNALING

THE AMERICAN LOCOMOTIVE COMPANY has ordered from the Union Switch & Signal Company ten sets of automatic train control equipment for use on new locomotives being built for the Delaware, Lackawanna & Western. These locomotives are to be used between Scranton, Pa., and Elmira, N. Y. The apparatus will have a one-speed-limit feature so arranged as to enforce a maximum rate of 20 miles an hour.

Supply Trade

J. D. Bowden has been assigned to duties as special representative of the transportation division of the **Philip Carey Company,** Cincinnati, Ohio, covering the southeastern portion of the United States.

The sale of railway equipment manufactured by the **Nordberg Manufacturing Company,** Milwaukee, Wis., and heretofore handled by the **R. H. Hyland Company** in the Chicago territory, is now being handled direct by the former company through its general sales representative, **W. W. Fitzpatrick.**

The Rockford Northwestern Malleable Corporation and the Gunite Corporation, both of Rockford, Ill., manufacturers of foundry products, have consolidated under the name of the **Gunite Foundries Corporation. Duncan P. Forbes** is president and general manager of the new corporation; **J. A. Forbes** is secretary and assistant to the president; **Frank C. Rutz** and **Erwin J. Mohr,** vice-presidents; **Noble J. Schmidt,** treasurer, and **L. R. McCullough,** advertising manager. Mr. McCullough also will serve as sales manager of the Guncor brake drum replacement division.

American Brake Shoe & Foundry Company

Consolidated net earnings of $1,386,138 were reported by the American Brake Shoe & Foundry Company for the year ending December 31, 1931, as compared with a 1930 net of $2,906,385. The 1931 profit in which was included $122,905 received in dividends from associated companies was equivalent, after the payment of preferred dividends, to $1.14 per share on the common stock outstanding. Of the dividends received from affiliates, $31,014 was paid from their earned surpluses but the report points out that "the principal associated companies, Ramapo Ajax Corporation and National Bearing Metals Corporation, are well fortified in their current asset positions and during the year reduced their funded debts $454,000 and $79,000 respectively."

During 1931, the total tonnage shipped by all companies affiliated with the American Brake Shoe & Foundry Company declined 31 per cent but, at the same time, selling and administrative costs were reduced to a figure 33 per cent below that of 1929. The balance sheet shows current assets of $9,397,601 as against current liabilities of $1,036,693 as of December 31; cash alone at $2,406,469 was more than twice the total current liabilities.

As to prospects for rail sales, the reports call attention to the fact that the companies' railroad products are primarily operating and maintenance of way materials and adds that constructive developments substantially improving the railroad situation should increase sales. Dividends paid during the year amounted to $2,187,958, of which $667,695 was required for the payment on preferred stock and $1,520,263 was disbursed on the common. Surplus at the close of the year was $10,651,947, of which $5,845,541 represented earned surplus.

OBITUARY

James L. Roney, who retired as general traffic manager of the American Rolling Mill Company in July, 1931, died in Middletown, Ohio, on January 28, following a heart attack.

William F. Bippus, president of the Joyce Cridland Company, Dayton, Ohio, while returning from his California home, was taken with heart seizure, as his train was nearing El Paso, Texas. He was removed to the hospital there, and died on February 3.

Holly T. Armstrong, manager of sales of the Montreal Locomotive Works and of the Canadian Steel Tire & Wheel Company, Montreal, Que., died on January 25, at the Montreal General Hospital. Mr. Armstrong was born in 1888 at Toronto, Ont., and was educated in the University of Chicago. After serving as a representative of the Davenport Locomotive Works, he went in 1913, to the American Locomotive Company as a salesman at New York. Mr. Armstrong resigned in 1919 and was appointed manager of sales of the Canadian Steel Tire & Wheel Company. Since 1926 he had served also as manager of sales of the Montreal Locomotive Works. Mr. Armstrong was on the executive board of the Railway Supply Manufacturers' Association, and was active in the affairs of the Canadian Railway Club, serving as chairman of its entertainment committee.

Construction

ILLINOIS CENTRAL.—This road will open bids on February 15 for the construction of two concrete piers in its Illinois River bridge at LaSalle, Ill., involving the placing of 3,000 cu. yd. of concrete at a cost of about $90,000. The placing of these piers is part of a program of reconstruction at this bridge, which is being undertaken in connection with the government project for deepening the river channel to 9 ft. A number of short bridge spans will be replaced with a 340-ft. through-truss fixed span affording a greater vertical clearance, which will involve also the reconstruction of the spans adjacent to the new span. The total expenditure involved is about $430,000.

NEW YORK, CHICAGO & ST. LOUIS.—This road plans to ask for bids soon for the placing of about 215,000 cu. yd. of material for the proposed extension to its 103rd Street yard at Chicago. The new yard will replace this road's old yard north of Ninety-fifth street near Stony Island avenue, which is to be abandoned to allow the opening of a number of city streets.

PENNSYLVANIA.—A contract for the strengthening of the east span of Bridge No. 223.36, over the Little Juniata river, west of Tyrone, Pa., has been awarded by this railroad to the John F. Casey Company, Pittsburgh, Pa. The work is estimated to cost $29,000.

Financial

BOSTON & MAINE.—*Joint Trackage with Central Vermont.*—The Interstate Commerce Commission has authorized this company and the Central Vermont to operate over each other's tracks as follows: Boston & Maine over Central Vermont (for overhead freight in through trains) between Windsor, Vt., and White River Junction, 14 miles, and from the Connecticut river bridge to Windsor passenger station, 0.6 miles (exclusive rights except that the C. V. may use it for through trains); Central Vermont over Boston & Maine for through trains between Brattleboro and Windsor, 49 miles. The agreement is for 30 years and replaces year to year contracts under which exchange of trackage rights has been governed for more than forty years.

ILLINOIS CENTRAL.—*Passes Preferred Dividend.*—The directors of this company have omitted the regular semi-annual dividend of $3 due on preferred stock at this time.

LEHIGH VALLEY.—*Bonds.*—This company, which was authorized by the Interstate Commerce Commission on December 7 to pledge $10,000,000 of general consolidated mortgage 5 per cent bonds as collateral for short term notes, has applied to the commission for a modification to increase the authorization to $12,500,000.

LONG ISLAND.—*New Director.*—The directors of this company have elected Carleton H. Palmer of New York, who is president of E. R. Squibb & Sons, pharmaceutical manufacturers, to the board of directors.

MISSOURI PACIFIC.—*Bonds.*—The Interstate Commerce Commission has authorized the New Orleans & Lower Coast to issue $837,000 of general refunding mortgage 6 per cent bonds, series A, to be delivered to the Missouri Pacific in exchange for $300,000 of first mortgage bonds and in satisfaction of $537,000 of indebtedness.

PENNSYLVANIA.—*Acquisition of Bradford Railroad.*—The Interstate Commerce Commission has authorized the Western New York & Pennsylvania to acquire, and the Pennsylvania to operate, the Bradford Railroad in Bradford, Pa.

PENNSYLVANIA.—*Will Seek Loan to Continue Electrification.*—General W. W. Atterbury, president of the Pennsylvania, has announced that the company will apply to the Reconstruction Finance Corporation for a loan. The time of making the application or the extent of the loan, has not yet been definitely determined, but its purpose will be the continuance of the large program of electrification and terminal improvements which the company has under way. The company will make its own arrangements to meet maturities, and any other obligations when they arrive during the year.

President Atterbury stated as a rough guess that about five million dollars a month would be required. He said that the Pennsylvania was impressed with the necessity of continuing a reasonable program of construction work, not only to provide employment, but to secure the great advantages of lower priced material and other costs, and getting the work carried out promptly.

SEABOARD AIR LINE.—*Receivers' Certificates.*—The receivers have applied to the Interstate Commerce Commission for authority to issue $15,038,000 of receivers' certificates to meet various obligations.

SOUTHERN.—*Bonds.*—The Interstate Commerce Commission has authorized this company to issue $42,769,000 of development and general mortgage 4 per cent gold bonds, to be pledged as collateral for short term notes.

SPOKANE, PORTLAND & SEATTLE.—*Acquisition and Operation.*—The Interstate Commerce Commission has authorized this company to acquire a 2.9-mile line extending from Cormick Station, Ore., to St. Helen's.

SOUTHERN PACIFIC.—*Other Roads Ask Reconsideration of Cotton Belt Case.*—A joint petition has been filed with the Interstate Commerce Commission by the Missouri Pacific and the Texas & Pacific asking a reconsideration of the commission's decision conditionally authorizing the Southern Pacific to acquire control of the St. Louis Southwestern. They ask a further hearing and the imposition of additional conditions.

Average Prices of Stocks and of Bonds

	Feb. 9	Last week	Last year
Average price of 20 representative railway stocks..	28.83	33.36	95.65
Average price of 20 representative railway bonds..	67.21	69.95	94.28

Railway Officers

EXECUTIVE

F. M. Whitaker, vice-president in charge of traffic of the Chesapeake & Ohio, with offices at Richmond, Va., and Cleveland, Ohio, has been elected also to the same position on the Pere Marquette.

G. C. Randall, district manager of the Car Service Division of the American Railway Association, has been elected chairman of the general committee of the Transportation Division, succeeding **C. H. Wright,** deceased.

FINANCIAL, LEGAL AND ACCOUNTING

A. H. Campbell, assistant treasurer of the Wheeling & Lake Erie and the Lorain & West Virginia, has been promoted to treasurer of these companies, with headquarters as before at Cleveland, Ohio, succeeding **J. G. Stidger,** deceased. The position of assistant treasurer has been abolished.

W. R. Patterson, recently appointed general auditor of the Canadian Pacific, was born in Toronto, Ont., on January

W. R. Patterson

3, 1890. He commenced service with the C. P. R. on June 6, 1913, as clerk in the statistical department at Montreal, Que., and since then his headquarters

have been located in that city. In June, 1915, he was transferred as clerk to the auditor of disbursements. In November, 1921, he became senior clerk of the department, and in August, 1922, chief clerk. In May, 1925, Mr. Patterson was appointed assistant auditor of disbursements and in October, 1926, he became auditor. In January, 1931, he was promoted to deputy general auditor, the position he held until his recent promotion.

OPERATING

E. S. Pennebaker, principal assistant engineer of the Texas & Pacific, with headquarters at Dallas, Tex., has been appointed manager of the Texas Pacific-Missouri Pacific Terminal Railroad of New Orleans, La., in charge of all departments.

F. C. Wilkinson, who has been appointed superintendent of the Logansport division of the Pennsylvania, with headquarters at Logansport, Ind., has served in the engineering and operating departments of this road for 27 years. Mr. Wilkinson was born at Elmira, Ohio, and was educated at Ohio State University. He entered railway service in 1905, as an assistant on the engineering corps of the Pennsylvania, and

F. C. Wilkinson

served in various positions in the engineering and operating departments until 1928, when he was appointed assistant trainmaster on the Allegheny division. Later he was assigned to special duties in the office of the chief engineer at Philadelphia, Pa., where he was located at the time of his recent promotion to superintendent of the Logansport division, which was effective on February 1.

W. B. Kirkland, who has been appointed superintendent of transportation of the Southern Pacific, Pacific Lines, with headquarters at San Francisco, Cal., has been connected with the operating department of the Southern Pacific since 1903, except for a short period of military service. Mr. Kirkland entered railway service in 1902 with the Mobile & Ohio and the New Orleans & North Eastern, going with the Southern Pacific a year later as an operator on the Tucson division. He was advanced to train dispatcher on the same division in October, 1906, being further advanced to chief train dispatcher four years later. In October, 1912, Mr. Kirkland was promoted to chief train dispatcher of the Shasta division and four years later he was advanced to trainmaster, becoming assistant superintendent of the same division in October, 1918. From April, 1919, to March, 1920, Mr. Kirkland was on a leave of absence, during which time he served as a captain in the engineering

W. B. Kirkland

corps of the United States Army. In the latter month he returned to the service of the Southern Pacific as a trainmaster on the Stockton division, being transferred to the Sacramento division a few months later. In November, 1924, he was appointed assistant superintendent of the Rio Grande division, with headquarters at El Paso, Tex., and in July, 1928, he was further advanced to superintendent of the New Mexico division. When the New Mexico and Rio Grande divisions were consolidated in August, 1830, Mr. Kirkland was sent to San Francisco as a special representative on the staff of the general manager, which position he was holding at the time of his recent appointment as superintendent of transportation.

TRAFFIC

G. A. O'Brien has been appointed general freight and passenger agent of the Mexican Railway Company, Ltd., with headquarters at Mexico, D. F., to succeed **G. W. West,** who has been transferred.

F. H. Baird, assistant general passenger agent of the Cleveland, Cincinnati, Chicago & St. Louis, with headquarters at Cleveland, Ohio, has been transferred to Cincinnati, Ohio, succeeding **C. B. Munyan** and **J. W. Gardner,** transferred.

The jurisdiction of officers of the freight traffic department of the New York Central has been extended to include the Catskill Mountain branch, formerly the Ulster & Delaware, operation of which was taken over by the New York Central on February 1.

MECHANICAL

P. M. Sullivan, master mechanic of the Duluth, Missabe & Northern, has been appointed acting superintendent of motive power and cars, with headquarters as before at Proctor, Minn.

SPECIAL

Dr. J. C. Landenberger has been appointed chief surgeon, hospital department, of the Los Angeles & Salt Lake, with headquarters at Salt Lake City, Utah, succeeding **Dr. Philip Stephens,** who has been assigned to other duties.

A. A. Martz, captain of police of the Philadelphia Terminal division of the Pennsylvania, at Philadelphia, Pa., has been promoted to the newly-created position of superintendent of police of the Western region, with headquarters at Chicago.

OBITUARY

Thomas H. MacRae, managing editor of the Santa Fe magazine and president of the MacRae Blue Book Company, Chicago, died at New York on February 7.

Herbert G. Richardson, claims attorney for the Minneapolis, St. Paul & Sault Ste. Marie, with headquarters at Minneapolis, Minn., died on January 31, at his home at that place.

Thomas J. Heath, formerly auditor of passenger accounts of the St. Louis-San Francisco, with headquarters at St. Louis, Mo., who retired in 1918, died suddenly on February 1, at Old Orchard, Mo.

WORK ON AN IMPORTANT NEW RAILWAY LINE, 52 kilometers (31.7 miles) long, between Cracow and Miechow, was begun in December by the railway administration of Poland, according to the Central European Observer. The sum of 1,000,000 zlotys (approximately $112,000) has thus far been appropriated for work on this line, which will considerably shorten the distance between Cracow and Warsaw. Additional railway construction now under way in Poland, exclusive of the trunk line from Upper Silesia to the new Polish Baltic sea port of Gdynia, which is being built by a French syndicate, includes the construction of a line from Woropajewo to Druja; the double-tracking of the Krásné-Zdolbunow line; similar work between Lukow and Deblin, and reconstruction of the Podbrozie-Krolewsczyzna line. Expenditures totaling 5,917,000 zlotys ($663,865) on these various projects have been voted for 1932.

Revenues and Expenses of Railways

MONTH OF DECEMBER AND TWELVE MONTHS OF CALENDAR YEAR 1931

Name of road		Av. mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Operating income (or loss).	Net ry. operating income.	Net ry. operating income, 1930.
Akron, Canton & Youngstown	Dec.	171	$115,120	$28	$129,733	$11,531	$13,701	$10,043	$44,372	$29,906	$109,553	84.4	$20,180	$7,804	—3,957	$9,968
	12 mos.	171	1,808,018	814	1,915,686	246,174	195,510	136,554	594,423	173,435	1,345,403	70.2	570,283	420,930	252,045	547,355
Alton	Dec.	1,017	899,604	245,724	1,300,792	177,088	6,647,656	72,941	498,323	51,958	7,466,109	574.0	—6,165,317	—6,225,215	—6,337,164	—288,861
	12 mos.	1,027	13,729,975	3,142,232	18,848,629	2,314,567	9,962,277	861,057	7,553,393	688,958	21,524,707	114.2	—2,676,078	—3,786,858	—5,518,995	64,301
Alton & Southern	Dec.	30	.....	.....	72,659	8,078	6,142	6,138	29,229	20,933	70,520	97.05	2,139	5,244	2,441	—49,738
	12 mos.	30	.....	.....	1,068,641	106,154	84,147	62,938	396,101	79,356	728,696	68.19	339,945	238,096	212,303	218,972
Atchison, Topeka & Santa Fe	Dec.	9,746	6,962,462	1,473,546	9,577,336	1,286,166	2,725,228	411,233	3,358,972	445,606	8,172,917	85.3	1,404,419	1,231,547	1,290,661	2,282,442
	12 mos.	9,675	116,158,078	20,828,694	150,073,624	19,530,746	33,205,403	4,761,761	47,021,334	5,096,546	109,299,248	72.8	40,774,376	27,644,126	28,253,449	38,443,607
Gulf, Colorado & Santa Fe	Dec.	1,955	1,149,418	67,819	1,310,105	50,543	356,411	59,459	532,813	113,948	1,276,527	97.4	33,578	—194,913	—283,235	328,165
	12 mos.	1,975	16,880,273	982,649	19,000,523	2,614,446	4,090,835	680,887	6,480,343	978,287	14,959,155	78.7	4,041,368	2,658,009	1,455,792	4,168,968
Panhandle & Santa Fe	Dec.	1,876	737,121	53,862	853,055	92,548	202,661	21,234	245,352	45,362	765,567	89.7	87,488	32,795	—62,466	12,294
	12 mos.	1,825	10,585,657	745,710	12,107,113	1,680,280	2,525,808	242,705	3,546,299	447,211	8,554,522	70.7	3,552,591	2,974,676	1,740,033	2,263,892
Atlanta & West Point	Dec.	93	57,714	24,231	96,748	21,800	28,851	10,587	54,574	11,175	130,585	135.0	—33,837	—46,205	—52,203	374
	12 mos.	93	1,228,117	331,082	1,816,475	261,498	370,466	122,902	768,981	139,525	1,708,022	94.0	108,453	—31,271	—150,385	14,502
Western of Alabama	Dec.	133	50,153	25,663	83,794	30,862	36,319	10,606	49,759	10,917	141,608	59.2	—57,814	—60,408	—40,828	29,540
	12 mos.	133	1,285,991	354,426	1,837,921	301,539	469,089	130,693	721,308	139,538	1,801,805	98.0	36,116	—88,267	—6,326	325,919
Atlanta, Birmingham & Coast	Dec.	639	200,337	10,309	237,981	63,030	53,603	23,553	125,572	18,473	295,196	124.0	—57,215	—67,986	—82,914	—96,124
	12 mos.	639	2,845,333	121,467	3,327,528	821,653	816,727	310,688	1,603,577	229,668	3,893,501	117.0	—565,973	—753,213	—953,258	—659,657
Atlantic Coast Line	Dec.	5,144	3,106,570	461,386	4,050,101	517,960	767,195	157,734	1,511,491	166,749	3,156,421	77.9	893,680	660,622	521,746	686,527
	12 mos.	5,157	41,390,424	7,488,762	54,088,005	7,956,881	10,862,488	1,770,545	20,105,138	2,031,084	43,188,471	79.8	10,899,534	6,111,407	4,748,109	7,241,304
Charleston & Western Carolina	Dec.	342	127,720	2,992	136,872	25,307	31,518	6,329	70,140	5,484	138,603	101.3	—1,731	—12,418	—4,695	20,496
	12 mos.	342	2,318,611	50,520	2,453,007	403,776	356,750	84,561	923,950	76,223	1,842,690	75.1	610,317	388,049	359,240	299,006
Baltimore & Ohio	Dec.	5,639	8,564,152	1,101,101	10,567,130	794,790	2,140,145	420,000	4,415,375	637,497	8,532,091	80.7	2,035,039	1,442,163	1,150,566	3,067,790
	12 mos.	5,652	131,977,796	14,801,546	158,474,627	13,524,048	31,542,648	5,887,545	59,443,637	7,790,757	119,944,440	75.7	38,530,187	29,662,910	26,230,851	40,248,614
Baltimore & Ohio Chic. Term	Dec.	85	.....	.....	285,762	39,725	46,662	2,412	167,682	18,645	281,649	98.6	4,113	—42,111	53,641	203,397
	12 mos.	85	.....	.....	3,408,070	399,814	471,959	27,872	1,837,885	219,083	3,023,788	88.7	384,282	—202,878	815,025	1,371,081
Staten Island Rapid Transit	Dec.	23	52,244	102,569	162,909	Cr. 9,283	14,209	2,348	107,539	19,098	133,911	82.2	28,998	13,801	117	5,997
	12 mos.	23	672,687	1,383,094	2,160,991	114,806	170,346	25,117	1,113,278	214,763	1,638,310	75.8	522,681	317,584	159,660	298,132
Bangor & Aroostook	Dec.	619	493,322	33,555	554,139	105,360	91,584	6,550	151,634	32,210	388,087	70.0	166,052	117,180	105,958	134,676
	12 mos.	619	6,183,950	389,056	6,885,200	1,395,497	1,321,099	70,255	1,750,800	338,379	4,899,630	71.2	1,985,570	1,388,323	1,388,817	2,335,907
Belt Ry. Co. of Chicago	Dec.	53	.....	.....	337,621	20,344	35,491	2,682	191,930	8,566	259,013	76.7	78,608	35,199	118,833	143,223
	12 mos.	53	.....	.....	5,244,415	341,453	551,507	41,589	2,542,007	115,819	3,592,375	68.5	1,652,040	827,651	1,269,145	1,807,727
Bessemer & Lake Erie	Dec.	226	272,851	1,330	281,041	73,534	191,230	12,401	147,369	45,748	470,310	167.3	—189,269	—84,468	—79,413	—212,718
	12 mos.	227	8,513,644	27,089	8,673,827	1,161,167	2,424,486	157,673	2,381,712	454,484	6,593,983	76.0	2,079,844	2,419,065	2,373,536	4,736,008
Boston & Maine	Dec.	2,092	2,603,115	831,445	4,145,112	355,221	598,770	85,271	1,727,207	199,162	2,975,186	71.8	1,169,926	903,298	732,236	993,809
	12 mos.	2,089	37,858,191	11,445,035	57,784,978	8,469,286	8,156,524	1,026,374	21,817,056	2,537,410	42,225,601	73.1	15,559,377	12,371,390	9,894,768	12,251,159
Brooklyn Eastern Dist. Term	Dec.	11	70,550	.....	71,441	7,973	8,676	88	26,680	6,995	50,412	70.6	21,029	16,389	16,389	20,057
	12 mos.	11	1,167,411	.....	1,184,565	113,593	140,575	4,895	373,819	72,027	704,909	59.5	479,656	401,717	401,717	434,337
Buffalo & Susquehanna	Dec.	253	103,716	293	120,081	20,083	87,861	3,444	38,690	6,760	156,838	130.6	—36,757	—38,988	—32,620	57,763
	12 mos.	253	1,368,641	4,388	1,556,436	279,190	426,704	27,425	455,683	82,985	1,271,967	81.7	284,469	254,422	323,892	473,084
Buffalo, Rochester & Pittsburgh	Dec.	601	814,274	29,142	893,622	104,028	457,852	28,750	373,933	50,405	1,014,615	113.5	—120,993	—145,618	—166,568	197,330
	12 mos.	601	11,850,994	388,853	12,722,365	1,462,522	3,413,833	341,127	5,028,448	484,391	10,748,346	84.5	1,974,019	1,637,990	1,335,706	2,227,505
Burlington-Rock Island	Dec.	310	101,706	2,038	113,695	Cr. 73	320,810	3,388	59,223	12,754	396,039	348.3	—282,344	—288,219	—273,508	—50,818
	12 mos.	333	1,381,667	28,616	1,489,266	246,033	485,012	72,396	630,142	146,109	1,573,845	105.7	—84,579	—167,084	—385,638	—795,925
Canadian Pacific Lines in Maine	Dec.	233	123,731	27,960	167,249	34,946	16,274	7,612	82,569	3,398	144,543	86.4	22,706	14,868	—9,147	—33,251
	12 mos.	233	1,628,362	255,963	2,036,794	644,127	411,320	91,019	956,225	46,944	2,149,379	105.5	—112,585	—244,423	—463,741	—336,780
Canadian Pacific Lines in Vermont	Dec.	85	60,300	16,176	96,031	27,923	9,407	2,281	63,974	2,358	105,879	110.3	—9,848	—16,790	—39,778	—55,462
	12 mos.	85	834,908	248,893	1,347,015	228,572	264,382	26,199	895,751	30,869	1,445,608	107.3	—98,593	—155,115	—465,063	—382,356
Central of Georgia	Dec.	1,944	832,473	116,025	1,085,218	129,406	224,533	62,006	568,785	78,131	1,067,486	98.4	17,732	—76,416	—98,699	237,785
	12 mos.	1,944	13,309,068	1,825,932	17,071,029	1,758,313	3,015,093	776,223	7,378,760	957,194	13,981,681	81.9	3,089,348	1,740,498	1,576,104	3,668,811
Central New Jersey	Dec.	692	2,147,953	458,421	2,857,532	227,170	328,422	47,649	1,209,588	102,502	1,933,014	67.6	924,518	498,516	458,468	307,772
	12 mos.	692	29,999,680	6,770,219	39,441,832	3,754,016	7,355,145	703,430	16,065,816	1,325,610	29,451,426	74.7	9,990,406	5,228,367	4,224,783	7,152,607
Central Vermont	Dec.	457	324,071	59,526	413,267	64,785	73,955	15,240	196,147	23,077	374,481	90.6	38,786	24,878	37,574	52,934
	12 mos.	456	5,070,412	822,359	6,530,030	1,200,732	1,186,624	212,544	2,838,812	279,431	5,738,161	87.9	791,869	616,327	681,389	1,270,776
Chesapeake & Ohio	Dec.	3,115	6,956,723	274,055	7,557,191	866,689	1,735,869	153,324	2,194,278	302,334	5,260,227	69.6	2,296,964	1,695,013	1,694,453	2,765,888
	12 mos.	3,118	109,882,030	4,110,247	119,552,171	15,397,177	22,704,391	2,097,869	30,172,793	3,972,276	74,497,863	62.3	45,054,308	35,417,455	35,329,943	40,523,227
Chicago & Eastern Illinois	Dec.	938	828,249	140,607	1,097,184	97,117	245,639	46,002	540,766	63,246	1,003,109	91.4	94,075	—22,843	—157,864	—4,815,441
	12 mos.	938	11,856,112	1,838,814	15,135,961	1,906,484	3,201,491	825,059	6,856,959	776,359	13,704,653	90.5	1,431,308	35,858	—1,700,501	—5,505,969
Chicago & Illinois Midland	Dec.	131	217,849	2,132	232,065	16,085	44,968	19,165	67,610	17,739	163,755	70.6	68,310	61,686	47,836	57,326
	12 mos.	131	2,608,992	30,249	2,735,828	286,291	534,308	253,314	811,647	228,848	2,094,623	76.6	641,205	550,161	470,195	565,496

Revenues and Expenses of Railways

MONTH OF DECEMBER AND TWELVE MONTHS OF CALENDAR YEAR 1931—CONTINUED

Name of road		Av. mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Operating income (or loss).	Net ry. operating income.	Net ry. operating income, 1930.
Chicago & North Western	Dec.	8,442	$4,730,736	$1,088,199	$6,810,968	$1,223,491	$1,592,183	$171,846	$2,940,101	$335,649	$6,309,056	92.6	$501,912	$435,165	$207,944	$1,135,523
	12 mos.	8,457	75,993,897	14,749,010	102,270,339	15,997,935	20,584,486	2,336,936	41,356,049	4,348,399	85,162,948	83.3	17,107,391	9,392,803	6,272,136	17,432,851
Chicago, Burlington & Quincy	Dec.	9,306	5,729,678	796,433	7,568,950	680,681	1,646,506	206,772	2,941,322	327,097	5,863,040	77.5	1,705,910	1,107,636	726,918	1,459,521
	12 mos.	9,312	88,237,563	11,205,062	111,218,959	13,721,164	17,785,942	2,913,238	38,030,549	4,200,625	77,465,969	69.7	33,752,990	23,773,749	20,506,918	27,956,064
Chicago Great Western	Dec.	1,495	1,267,354	88,604	1,478,343	200,551	176,499	68,697	554,624	57,191	1,047,352	70.8	430,991	390,315	175,386	274,206
	12 mos.	1,495	17,437,811	1,261,794	20,107,787	2,790,871	2,277,687	962,689	7,424,340	701,159	14,183,465	70.5	5,924,322	4,987,635	2,571,094	2,853,179
Chicago, Indianapolis & Louisville	Dec.	644	619,929	75,657	793,611	50,783	176,331	30,642	329,275	29,432	625,310	78.8	168,301	104,067	3,901	93,967
	12 mos.	646	8,830,360	1,062,839	11,054,802	1,072,610	2,279,051	411,536	4,532,821	395,519	8,798,059	79.6	2,256,743	1,502,503	177,314	1,138,760
Chicago, Mil., St. Paul & Pacific	Dec.	11,273	6,104,049	686,486	7,698,436	672,160	1,640,401	243,215	3,272,807	305,093	6,147,742	79.9	1,550,694	1,046,596	594,231	833,475
	12 mos.	11,303	91,392,070	8,952,421	111,423,772	17,041,150	21,755,076	3,344,361	43,165,900	3,940,846	89,269,446	80.1	22,154,326	13,411,004	8,334,406	15,954,548
Chicago River & Indiana	Dec.	20	.....	.....	402,801	6,122	20,481	1,535	143,908	12,226	184,272	45.7	218,529	165,386	234,690	307,503
	12 mos.	20	.....	.....	5,431,184	402,122	385,481	21,638	1,850,884	202,827	2,862,952	52.7	2,568,232	1,987,113	2,868,999	3,204,483
Chicago, Rock Island & Pacific	Dec.	7,620	4,383,334	761,608	5,807,144	603,352	1,368,518	224,377	2,669,463	253,668	5,210,032	89.8	592,112	56,237	—284,024	956,241
	12 mos.	7,600	74,041,509	10,182,263	93,050,288	10,297,256	17,227,718	2,778,382	35,699,158	3,977,399	70,947,698	76.2	22,102,590	15,818,494	11,106,338	18,063,976
Chicago, Rock Island & Gulf	Dec.	721	384,244	33,203	405,978	38,999	45,121	19,183	135,967	20,373	262,083	64.6	143,895	150,070	119,011	137,665
	12 mos.	682	5,476,586	471,418	6,019,275	690,729	489,745	244,166	1,854,599	263,110	3,579,169	59.5	2,440,106	2,170,387	1,817,669	1,683,831
Chic., St. Paul, Minn. & Omaha	Dec.	1,736	1,000,682	175,218	1,283,515	154,864	281,971	34,331	664,551	75,150	1,221,862	95.2	61,653	—33,041	—104,617	—254,639
	12 mos.	1,736	14,547,733	2,397,901	18,586,905	2,787,737	3,523,591	461,864	8,508,648	979,299	16,385,094	88.2	2,201,811	1,051,303	123,972	1,659,994
Clinchfield R. R.	Dec.	309	359,128	3,891	369,003	39,046	82,947	18,589	84,556	14,719	239,857	65.0	129,146	68,039	78,206	152,525
	12 mos.	309	5,247,585	66,378	5,410,192	604,733	1,323,732	223,499	1,170,834	208,396	3,530,509	65.3	1,879,683	1,133,551	1,460,070	1,927,195
Colorado & Southern	Dec.	1,037	515,992	32,645	617,510	68,274	136,555	16,823	216,731	36,522	468,438	75.9	149,072	71,056	95,444	176,841
	12 mos.	1,037	6,688,682	583,826	8,039,603	1,135,147	1,604,734	189,739	2,855,981	467,244	6,266,559	77.9	1,773,044	949,774	714,407	1,384,364
Ft. Worth & Denver City	Dec.	695	417,415	57,472	567,290	46,555	103,836	18,266	181,869	36,862	377,059	66.5	190,231	159,054	137,631	170,129
	12 mos.	695	6,403.851	801,794	8,071,410	795,875	1,188,423	232,184	2,397,412	452,357	5,082,769	63.0	2,988,641	2,579,819	2,240,033	2,163,713
Wichita Valley	Dec.	270	60,112	1,106	64,940	11,224	7,076	28	21,825	1,694	41,843	64.4	23,097	16,310	14,223	18,110
	12 mos.	270	671,640	13,728	726,167	163,073	51,893	577	281,225	21,486	517,467	71.3	208,700	129,940	13,741	—122,164
Columbus & Greenville	Dec.	167	77,039	7,570	89,598	21,313	11,791	3,973	29,495	11,643	78,188	87.3	11,410	1,147	1,384	11,639
	12 mos.	167	972,774	72,658	1,106,817	195,439	176,535	46,789	426,048	134,597	979,297	88.5	127,520	80,463	87,235	116,976
Conemaugh & Black Lick	Dec.	20	14,879	.....	32,499	8,837	13,551	374	21,048	3,200	47,010	144.7	—14,511	—12,236	—12,457	—2,806
	12 mos.	20	387,977	.....	711,870	99,833	180,469	5,647	416,805	41,197	743,951	104.5	—32,081	—35,906	—3,158	188,797
Delaware & Hudson	Dec.	854	1,795,714	122,002	2,075,052	204,329	585,966	59,115	872,784	141,142	1,908,828	92.0	166,224	151,224	160,644	119,311
	12 mos.	874	26,428,359	2,064,758	30,672,041	4,153,633	7,526,630	686,958	11,444,687	1,787,082	25,710,733	83.8	4,961,308	4,175,605	4,279,682	5,868,962
Delaware, Lackawanna & Western	Dec.	998	2,898,749	707,287	4,297,746	294,175	929,018	123,139	1,999,953	166,482	3,543,225	82.4	754,521	545,806	542,864	782,856
	12 mos.	998	41,840,935	8,710,067	58,674,838	5,682,251	11,278,758	1,603,862	25,057,052	2,059,118	46,140,666	78.6	12,534,172	7,295,433	7,241,204	11,159,923
Denver & Rio Grande Western	Dec.	2,557	1,502,776	102,597	1,724,230	91,398	387,574	54,894	619,703	89,346	1,250,501	72.5	473,729	323,043	337,090	523,666
	12 mos.	2,551	20,140,376	1,748,369	23,484,818	2,703,660	4,485,324	641,171	7,387,345	1,034,568	16,423,440	69.9	7,061,378	5,153,962	5,137,991	6,940,942
Denver & Salt Lake	Dec.	232	175,246	7,740	195,927	21,611	46,114	1,892	34,123	10,371	114,111	58.2	81,816	58,158	62,493	131,814
	12 mos.	232	2,038,529	95,814	2,302,835	358,080	395,303	23,161	395,597	131,228	1,303,369	56.6	999,466	799,786	859,359	1,123,753
Detroit & Mackinac	Dec.	242	38,890	3,903	49,493	7,277	13,614	1,328	26,033	5,983	54,232	109.6	—4,739	—12,254	—12,098	—3,868
	12 mos.	242	839,619	57,547	1,000,891	168,941	170,249	19,084	326,289	53,122	734,866	73.4	266,025	195,064	188,803	27,683
Detroit & Toledo Shore Line	Dec.	50	249,562	.....	251,816	18,739	25,431	8,758	73,577	9,401	135,906	54.0	115,910	97,386	49,916	74,969
	12 mos.	50	2,864,163	.....	2,905,031	315,105	318,963	93,281	824,799	99,635	1,641,953	56.5	1,263,078	1,004,812	444,501	707,467
Detroit Terminal	Dec.	19	.....	.....	50,498	8,190	8,573	.....	29,466	4,008	50,237	99.5	261	—10,255	—18,671	1,402
	12 mos.	19	.....	.....	857,443	97,655	104,883	36	476,333	47,702	726,609	84.7	130,834	—11,582	—100,361	102,036
Detroit, Toledo & Ironton	Dec.	487	384,634	971	398,166	42,839	72,912	11,279	148,971	27,465	303,324	76.2	94,842	52,456	25,370	109,990
	12 mos.	492	5,563,169	12,464	5,754,167	667,126	913,640	152,257	1,978,480	335,519	4,031,005	70.1	1,723,162	1,154,339	954,712	3,156,870
Duluth, Missabe & Northern	Dec.	563	63,381	3,049	86,290	105,561	191,321	3,578	160,329	50,849	511,492	592.8	—425,202	352,952	346,527	679,245
	12 mos.	563	9,649,136	40,416	11,062,177	2,219,892	3,068,355	45,046	2,915,099	480,771	8,728,574	78.9	2,333,603	2,740,798	2,741,254	7,687,349
Duluth, Winnipeg & Pacific	Dec.	178	49,706	5,038	56,429	5,640	10,082	776	42,206	6,028	64,628	114.5	—8,199	—10,631	1,679	—4,893
	12 mos.	178	940,691	84,821	1,105,739	302,984	359,307	45,987	610,702	80,787	1,413,540	127.8	—307,801	—362,750	—320,900	21,688
Elgin, Joliet & Eastern	Dec.	447	746,075	3	809,925	114,409	188,293	14,539	411,955	68,357	797,449	98.5	12,476	—100,644	—149,545	—120,327
	12 mos.	447	12,159,464	60	13,342,163	1,884,489	2,794,674	186,141	5,805,065	654,282	11,323,072	84.9	2,019,091	713,975	—8,411	3,015,064
Erie Railroad	Dec.	2,046	4,236,574	577,280	5,376,645	520,714	1,155,782	165,093	2,317,435	298,890	4,478,434	83.3	898,271	634,468	473,352	879,666
	12 mos.	2,046	64,547,679	7,652,419	79,227,205	9,871,634	16,734,955	1,984,600	31,062,673	3,436,818	63,431,268	80.1	15,795,937	11,219,719	9,854,051	13,689,974
Chicago & Erie	Dec.	269	653,090	27,833	740,297	80,978	113,334	27,667	239,350	43,396	504,715	68.2	235,582	245,417	24,098	25,346
	12 mos.	269	9,720,223	424,440	10,926,396	1,354,906	1,414,660	346,584	3,274,252	499,749	6,883,232	63.0	4,043,164	3,433,122	498,051	1,337,218

Revenues and Expenses of Railways

MONTH OF DECEMBER AND TWELVE MONTHS OF CALENDAR YEAR 1931—CONTINUED

Name of road		Av. mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Operating income (or loss).	Net ry. operating income.	Net ry. operating income, 1930.
Chicago & Erie	Dec.	269	653,090	27,833	740,257	1,354,906	1,414,660	346,584	3,274,252	499,749	6,883,252	95.3	$47,005	—$1,414,660	—$1,461,665	—$1,461,665
	12 mos.	269	9,720,223	424,440	10,926,396											
New Jersey & New York	Dec.	45	$17,705	$79,060	$100,951	$7,733	$26,701	$1,965	$56,542	$3,343	$96,284	95.4	$4,667	—$7,241	—$27,312	—$19,153
	12 mos.	45	272,270	996,587	1,312,213	136,029	285,531	17,553	676,715	43,098	1,158,915	88.3	153,298	93,114	—211,548	—244,962
N. Y., Susquehanna & Western	Dec.	131	216,024	31,520	272,021	2,839	56,245	6,015	134,675	11,931	211,700	77.8	60,321	40,658	18,883	32,132
	12 mos.	131	3,434,209	406,069	4,171,279	477,805	612,748	58,586	1,725,609	151,123	3,025,682	72.5	1,145,597	764,514	478,006	628,607
Florida East Coast	Dec.	864	570,126	128,330	862,041	111,700	118,054	28,720	206,211	35,490	507,636	58.9	354,405	294,976	250,601	291,886
	12 mos.	864	5,650,126	2,439,751	9,379,030	1,401,861	1,674,876	329,427	2,771,491	537,015	6,859,850	73.1	2,519,180	1,317,873	664,636	1,040,154
Fort Smith & Western	Dec.	249	63,675	2,451	70,285	12,489	17,804	4,812	26,278	4,721	66,265	94.3	4,020	1,844	—1,566	2,224
	12 mos.	249	718,841	33,880	813,190	168,960	173,853	56,941	332,052	63,766	790,986	97.3	22,204	—16,850	—112,002	53,855
Galveston Wharf	Dec.	13	.....	.....	197,855	39,239	6,321	4,261	16,792	7,290	90,348	45.7	107,507	78,087	79,881	57,202
	12 mos.	13	.....	.....	1,956,819	446,441	61,792	48,336	328,503	92,843	1,161,937	59.4	794,882	505,623	517,623	429,364
Georgia R. R.	Dec.	328	190,737	24,066	244,912	21,969	63,169	21,426	137,637	21,616	266,179	108.7	—21,267	—21,360	—4,119	57,336
	12 mos.	328	3,377,380	329,166	4,036,420	416,122	786,677	249,877	1,833,601	270,558	3,562,015	88.2	474,405	388,477	545,104	735,007
Georgia & Florida	Dec.	463	66,733	2,185	74,068	32,001	14,487	8,547	38,351	3,766	97,342	131.4	—23,274	—23,439	—25,054	—3,398
	12 mos.	463	1,251,370	36,121	1,357,711	335,144	236,969	119,086	554,744	86,903	1,334,578	98.3	23,133	—59,785	—92,091	89,606
Grand Trunk Western	Dec.	1,021	1,113,260	94,130	1,316,236	222,424	290,039	27,243	743,692	99,997	1,375,272	104.5	—59,036	—161,314	—245,142	—179,114
	12 mos.	1,020	16,949,589	1,320,855	19,778,020	3,206,277	4,213,174	690,292	9,258,962	1,226,841	18,653,413	94.3	1,124,607	—231,824	—1,919,135	294,368
Canadian Nat'l Lines in New Eng.	Dec.	172	63,839	9,367	83,459	18,484	36,606	1,910	85,739	15,019	161,192	193.1	—77,733	—93,016	—147,670	—112,777
	12 mos.	172	1,078,425	161,393	1,415,927	333,536	369,674	55,748	929,809	114,675	1,834,748	129.6	—418,821	—590,669	—1,154,764	—1,055,891
Great Northern	Dec.	8,338	3,588,163	476,791	4,760,452	413,054	1,049,295	197,086	1,901,523	188,613	3,631,756	76.3	1,128,696	970,648	896,822	346,273
	12 mos.	8,357	63,344,821	6,042,610	77,087,455	9,413,813	14,538,454	2,532,764	25,846,075	2,660,972	55,285,954	71.7	21,801,501	14,612,579	12,669,420	21,912,508
Green Bay & Western	Dec.	234	90,810	1,734	95,161	7,543	10,590	4,647	64,617	3,527	90,785	95.4	4,376	1,764	709	30,430
	12 mos.	234	1,349,311	19,713	1,416,362	249,962	229,270	68,341	583,021	35,187	1,165,007	82.2	251,355	170,614	146,643	289,926
Gulf & Ship Island	Dec.	307	57,723	15,345	86,391	6,670	9,851	4,007	58,987	7,206	86,978	100.7	—587	40,404	31,379	—19,279
	12 mos.	307	1,203,126	191,448	1,627,830	378,164	268,330	52,269	855,174	81,299	1,647,390	101.2	—19,560	—219,863	—365,437	—118,761
Gulf, Mobile & Northern	Dec.	733	261,602	12,684	293,238	33,862	47,172	19,879	110,425	19,813	231,127	78.82	62,111	51,808	32,474	19,925
	12 mos.	733	3,742,003	137,964	4,094,743	586,031	737,922	287,716	1,508,150	243,780	3,364,400	82.16	730,343	431,521	166,003	631,118
Illinois Central	Dec.	5,018	5,483,141	957,765	7,038,997	640,946	1,339,507	251,326	2,885,976	347,586	5,512,718	78.3	1,526,279	1,341,036	1,347,467	2,605,944
	12 mos.	5,018	78,264,606	12,294,635	99,095,976	11,778,253	21,508,136	2,822,763	39,455,747	4,300,976	80,579,955	81.3	18,516,021	12,545,285	11,421,469	20,907,875
Yazoo & Mississippi Valley	Dec.	1,681	1,000,548	116,345	1,198,545	74,430	202,508	38,520	522,032	61,047	900,039	75.1	298,506	294,096	183,112	195,996
	12 mos.	1,682	15,144,627	1,461,971	17,692,218	2,634,414	3,000,227	471,935	7,276,108	807,901	14,217,699	80.4	3,474,519	1,907,976	425,949	2,685,202
Illinois Central System	Dec.	6,700	6,483,689	1,074,110	8,237,542	715,376	1,542,015	289,846	3,408,008	408,633	6,412,757	77.8	1,824,785	1,635,132	1,530,579	2,801,940
	12 mos.	6,701	93,409,233	13,756,606	116,788,194	14,412,667	24,508,363	3,294,698	46,731,855	5,108,877	94,797,654	81.2	21,990,540	14,453,261	11,847,418	23,596,521
Illinois Terminal	Dec.	543	324,370	70,223	416,739	34,976	58,972	19,190	164,160	31,667	308,067	73.92	108,672	81,172	55,989	127,588
	12 mos.	552	5,049,688	967,144	6,317,326	727,168	781,330	234,965	2,109,084	414,947	4,241,936	67.15	2,075,390	1,709,936	1,367,977	1,451,088
Kansas City Southern	Dec.	784	622,417	36,152	764,859	70,000	163,795	41,051	277,640	96,216	643,719	84.2	121,140	69,745	40,339	51,932
	12 mos.	784	10,351,096	499,487	12,273,337	1,131,943	2,100,411	602,013	3,804,282	823,666	8,464,153	69.0	3,809,184	2,730,788	2,296,932	3,260,588
Texarkana & Ft. Smith	Dec.	99	72,759	2,354	86,236	23,863	12,493	6,923	35,642	8,476	88,908	103.1	—2,672	—19,405	—37,871	44,364
	12 mos.	99	1,569,864	32,530	1,800,073	210,754	138,815	84,174	509,053	114,766	1,082,243	60.1	717,830	605,807	322,496	510,190
Kansas, Oklahoma & Gulf	Dec.	326	177,511	908	181,708	37,616	24,170	13,028	47,836	12,330	Cr.32,211	17.7	213,919	191,128	176,527	35,714
	12 mos.	326	2,528,021	11,557	2,588,271	309,417	292,275	159,102	617,711	132,583	1,337,210	51.7	1,251,061	1,014,164	787,538	863,883
Lake Superior & Ishpeming	Dec.	160	23,639	154	25,205	16,191	16,909	600	18,706	10,563	62,969	249.8	—37,764	—44,550	—46,134	—76,711
	12 mos.	160	1,067,615	4,192	1,229,306	267,498	274,376	7,166	348,069	97,849	994,947	80.9	234,359	59,631	41,142	516,530
Lake Terminal	Dec.	12	.....	.....	30,268	2,438	4,051	.....	18,743	2,641	27,873	92.1	2,395	8,384	8,731	—9,539
	12 mos.	12	.....	.....	638,648	78,964	85,850	.....	326,155	27,234	518,203	81.1	120,445	94,983	95,431	42,045
Lehigh & Hudson River	Dec.	96	128,974	468	139,208	15,689	23,333	3,390	67,105	9,877	119,382	85.8	19,826	9,131	—2,533	4,146
	12 mos.	96	1,883,648	8,449	1,998,941	236,290	314,382	43,989	720,054	112,773	1,427,476	71.4	571,465	407,382	213,748	242,708
Lehigh & New England	Dec.	216	298,363	565	302,878	28,434	66,070	5,629	111,444	21,191	232,766	76.9	70,112	131,557	142,062	158,459
	12 mos.	216	4,054,896	8,623	4,107,459	537,190	907,374	68,790	1,456,562	243,572	3,213,363	78.2	894,096	826,163	924,397	1,097,774
Lehigh Valley	Dec.	1,361	2,827,428	335,106	3,509,297	300,944	911,184	121,631	1,671,905	124,727	3,151,302	89.8	357,995	209,326	85,809	817,173
	12 mos.	1,361	41,653,736	4,192,211	50,024,627	4,664,229	11,447,869	1,549,138	21,479,507	1,569,968	40,979,422	81.9	9,045,205	5,866,090	4,601,720	8,537,808
Louisiana & Arkansas	Dec.	608	356,260	10,878	392,513	47,449	67,621	18,561	113,496	24,749	272,066	69.3	120,447	95,419	84,459	79,649
	12 mos.	608	5,376,914	153,865	5,852,321	761,389	797,394	248,965	1,528,616	274,604	3,615,032	61.8	2,237,289	1,680,084	1,460,968	1,264,387
Louisiana, Arkansas & Texas	Dec.	202	44,898	891	48,359	11,067	2,996	3,891	18,339	4,434	40,723	84.2	7,636	4,962	—112	—17,006
	12 mos.	202	672,890	11,869	717,441	210,439	97,372	42,161	277,690	55,618	683,092	95.2	34,349	—4,883	—84,608	—185,703
Louisville & Nashville	Dec.	5,263	4,991,254	601,831	6,089,971	699,236	1,493,078	218,827	2,209,564	320,314	4,974,966	81.7	1,115,005	731,416	783,159	1,269,467
	12 mos.	5,265	72,879,114	8,014,906	87,019,791	12,953,983	19,404,982	2,634,259	32,549,431	4,395,570	72,384,608	83.2	14,635,183	9,129,066	9,519,324	14,006,913

Revenues and Expenses of Railways

MONTH OF DECEMBER AND TWELVE MONTHS OF CALENDAR YEAR 1931—CONTINUED

Name of road		Av. mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Operating income (or loss).	Net ry. operating income.	Net ry. operating income, 1930.
Maine Central	Dec.	1,121	$764,781	$137,377	$1,031,816	$137,734	$207,565	$16,814	$480,329	$47,352	$889,787	86.2	$142,029	$86,068	$55,366	$311,910
	12 mos.	1,121	11,330,898	2,036,114	14,890,650	2,293,736	2,474,925	240,547	5,977,977	544,541	11,553,751	77.6	3,336,899	2,356,546	1,836,921	3,000,727
Midland Valley	Dec.	363	160,737	1,084	166,641	24,639	24,644	4,311	44,655	8,899	104,343	62.6	62,298	50,239	35,561	11,169
	12 mos.	363	2,025,916	26,476	2,124,508	344,304	243,627	56,927	562,908	116,350	1,314.118	61.9	810,390	661,808	516,853	837,307
Minneapolis & St. Louis	Dec.	1,627	602,064	32,460	683,648	57,460	160,473	35,891	381,050	42,399	677,231	99.1	6,417	4,509	—11,827	—36,744
	12 mos.	1,627	9,251,739	378,335	10,294,963	1,370,612	2,062,242	441,279	4,861,340	565,829	9,297,810	90.3	997,153	459,347	111,706	546,695
Minneapolis, St. Paul & S. S. Marie	Dec.	4,349	1,398,443	141,983	1,735,563	117,589	418,134	67,566	880,135	117,451	1,591,995	91.7	143,568	—17,443	—148,516	—260,317
	12 mos.	4,366	23,626,980	2,182,474	28,439,228	3,936,123	5,630,477	900,217	11,990,985	1,426,566	24,010,047	84.4	4,429,181	1,953,735	280,984	3,966,614
Duluth, South Shore & Atlantic	Dec.	560	107,988	18,265	145,249	27,018	42,353	6,273	86,712	8,733	173,014	119.1	—27,765	—56,920	—60,797	—40,765
	12 mos.	560	2,160,697	250,774	2,701,575	531,981	525,173	90,430	1,245,141	114,757	2,524,727	93.5	176,848	—178,349	—240,778	—40,417
Spokane International	Dec.	163	38,808	3,192	47,475	11,023	2,476	2,895	24,954	5,246	47,122	99.3	353	—4,365	—7,801	—4,283
	12 mos.	163	663,415	40,142	761,972	186,563	68,339	39,041	298,384	65,097	664,102	87.2	97,870	37,451	—9,786	75,594
Mississippi Central	Dec.	150	51,152	1,828	55,414	7,344	8,576	8,449	21,256	6,092	51,674	93.3	3,740	7,449	3,725	5,643
	12 mos.	150	937,882	26,670	995,829	151,412	141,651	102,827	294,683	76,333	766,831	77.0	228,998	185,636	135,257	131,298
Missouri & North Arkansas	Dec.	364	74,468	1,665	82,998	28,063	15,679	9,714	39,802	8,244	101,385	122.2	—18,387	—20,795	—32,963	—36,494
	12 mos.	364	1,086,839	25,351	1,185,951	298,801	173,273	113,203	473,638	97,161	1,154,675	97.4	31,276	1,017	—124,437	—14,918
Missouri-Illinois	Dec.	202	79,526	606	82,215	14,547	17,671	2,433	27,091	5,880	67,590	82.2	14,625	14,558	5,265	15,813
	12 mos.	202	1,283,192	10,371	1,323,038	209,509	264,216	39,424	408,199	72,807	992,341	75.0	330,697	270,872	164,708	295,792
Missouri-Kansas-Texas Lines	Dec.	3,188	2,021,693	275,928	2,579,458	259,023	354,934	119,264	890,704	141,748	1,783,222	69.1	796,236	598,727	443,137	1,259,964
	12 mos.	3,188	27,335,082	3,417,688	34,172,963	3,954,951	5,248,607	1,519,276	11,643,159	1,841,643	24,419,125	71.5	9,753,838	7,286,287	4,939,553	10,650,081
Missouri Pacific	Dec.	7,436	4,908,111	487,081	6,040,175	796,607	1,106,356	237,576	2,683,317	312,146	5,140,864	85.1	899,311	870,823	620,644	1,537,724
	12 mos.	7,444	79,709,811	7,131,656	95,268,193	11,718,017	16,295,179	3,235,517	35,100,766	3,974,177	70,540,153	74.0	24,728,040	20,956,895	16,809,458	20,790,036
Gulf Coast Lines	Dec.	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	...	.....	.....	.....	.....
	12 mos.	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	...	.....	.....	.....	.....
International-Great Northern	Dec.	1,159	690,225	96,936	909,013	135,947	140,739	33,380	425,852	65,258	811,775	89.40	97,238	56,339	—25,720	—78,619
	12 mos.	1,159	15,280,381	1,230,989	17,843,909	2,381,758	2,757,714	435,551	6,816,534	756,863	13,155,813	73.73	4,688,096	4,182,637	2,408,114	727,783
San Antonio, Uvalde & Gulf	Dec.	316	57,981	6,568	70,923	21,585	9,480	4,903	36,513	6,769	79,195	111.7	—8,272	—11,785	—40,897	28,739
	12 mos.	316	1,117,811	105,926	1,325,406	365,430	190,670	63,394	379,793	75,900	1,071,410	80.8	253,996	198,573	—125,375	128,485
Mobile & Ohio	Dec.	1,152	531,241	31,718	607,051	108,803	165,867	47,333	327,840	44,174	683,885	112.7	—76,834	—99,451	—138,268	—86,971
	12 mos.	1,152	9,011,542	418,802	10,044,745	1,506,947	2,004,972	594,366	4,339,777	584,662	9,004,218	89.6	1,040,527	372,106	—318,555	653,326
Monongahela	Dec.	177	334,823	1,372	338,387	14,158	31,795	1,201	86,567	9,625	143,346	42.4	195,041	182,854	104,159	78,422
	12 mos.	177	4,572,907	28,749	4,634,511	514,158	491,795	15,845	1,117,752	118,799	2,257,815	48.7	2,376,696	2,190,768	1,263,890	1,343,607
Monongahela Connecting	Dec.	6	.....	.....	50,173	13,582	23,953	250	33,635	2,805	74,225	147.9	—24,052	5,968	5,963	—12,511
	12 mos.	6	.....	.....	980,620	149,257	288,913	3,293	541,405	33,244	1,016,112	103.6	—35,492	—65,565	—64,249	192,223
Montour	Dec.	57	119,354	.....	119,446	12,309	34,732	1,432	36,266	6,802	91,486	76.5	27,960	26,280	44,857	55,229
	12 mos.	57	2,114,596	.....	2,124,657	263,937	481,574	17,166	537,475	92,897	1,390,953	65.5	733,704	708,935	915,766	970,533
Nashville, Chattanooga & St. Louis	Dec.	1,203	798,783	92,902	1,016,014	130,718	228,586	63,372	469,557	69,038	967,494	95.2	48,520	21,819	19,873	76,880
	12 mos.	1,203	12,284,179	1,419,860	15,140,254	2,527,323	3,171,276	813,463	6,105,864	894,781	13,580,865	89.7	1,559,389	966,456	822,215	2,112,288
Nevada Northern	Dec.	165	29,644	2,244	37,666	8,439	5,476	905	10,723	4,887	30,430	80.8	7,236	—1,493	1,320	1,050
	12 mos.	165	408,967	23,200	491,576	130,167	63,316	11,584	135,487	56,001	396.502	80.7	95,074	—262,052	—227,185	188,537
Newburgh & South Shore	Dec.	6	.....	.....	63,338	4,506	21,988	.....	31,529	5,845	63,868	100.8	—530	—7,104	—3,664	—451
	12 mos.	6	.....	.....	940,908	135,020	270,205	.....	448,665	77,822	931,712	99.0	9,196	—91,749	—53,188	147,147
New Orleans Great Northern	Dec.	264	121,365	9,983	135,567	14,403	23,745	13,475	58,706	8,311	118,640	87.5	16,927	18,286	—3,799	—2,344
	12 mos.	264	2,116,550	126,488	2,317,485	204,911	306,222	170,717	709,532	120,949	1,512,331	65.3	805,154	705,703	421,029	254,903
New Orleans Terminal	Dec.	20	.....	.....	116,529	5,125	7,115	.....	38,243	1,207	51,690	44.4	64,839	67,967	49,369	55,950
	12 mos.	20	22,100	.....	1,765,900	174,636	103,621	.....	542,161	17,493	837,905	47.4	927,995	799,556	542,650	519,119
New York Central	Dec.	11,421	17,016,756	6,642,774	27,219,157	3,077,438	5,805,646	687,745	11,606,085	1,321,665	22,950,565	84.3	4,268,592	1,973,917	580,046	2,999,492
	12 mos.	11,421	245,897,087	86,304,508	382,190,182	48,391,858	81,509,925	8,862,831	146,309,549	15,997,501	307,073,685	80.4	75,116,497	42,822,211	28,091,559	57,235,527
Indiana Harbor Belt	Dec.	118	.....	.....	685,991	85,170	6,233	4,616	293,457	25,602	436,549	63.6	249,442	183,965	130,173	60,996
	12 mos.	118	.....	.....	9,214,027	953,170	901,233	55,825	4,004,426	327,949	6,464,897	70.2	2,749,130	2,201,589	1,526,552	2,347,880
Pittsburgh & Lake Erie	Dec.	234	1,041,296	79,897	1,160,486	92,534	425,957	34,137	459,435	71,562	1,086,821	93.7	73,665	81,004	196,485	394,284
	12 mos.	234	16,156,429	1,161,225	17,836,549	1,645,818	5,494,491	401,612	7,023,371	912,447	15,518,775	87.0	2,317,774	1,178,626	3,276,312	7,373,119
New York, Chicago & St. Louis	Dec.	1,698	2,293,245	110,428	2,507,198	268,958	464,696	111,905	1,055,538	131,134	2,018,410	80.5	488,788	418,383	206,009	113,126
	12 mos.	1,698	33,689,505	1,472,423	36,551,358	4,925,510	6,376,526	1,456,139	14,119,310	1,533,485	28,317,786	77.5	8,233,572	5,750,237	2,542,098	5,648,754
N. Y., New Haven & Hartford	Dec.	2,092	3,757,107	2,700,832	7,441,518	874,906	873,753	100,221	2,717,755	280,284	4,980,728	66.9	2,460,790	2,024,095	1,469,376	2,134,260
	12 mos.	2,098	54,304,178	34,425,958	100,331,093	13,974,850	14,579,939	1,195,967	34,097,184	3,449,458	69,113,722	68.9	31,217,371	25,873,010	18,657,675	25,084,940

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OBSOLESCENCE
is cutting into the railroad dollar

RAILROADS are manufacturers. Their product is ton miles—their production machines are locomotives.

Present tools or equipment may be physically as good as new; they may have been well maintained, but if the progress of the art has made available more productive and more economical machinery, the older equipment is obsolete.

A very high percentage of locomotives are obsolete and will pile up losses from excess cost of operation as long as they are kept in service.

LIMA LOCOMOTIVE WORKS INCORPORATED

LIMA LOCOMOTIVE WORKS • Incorporated • LIMA • OHIO

Revenues and Expenses of Railways

MONTH OF DECEMBER AND TWELVE MONTHS OF CALENDAR YEAR 1931—CONTINUED

Name of road		Av. mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Operating income (or loss).	Net ry. operating income.	Net ry. operating income, 1930.
New York Connecting	Dec.	20	$192,889	$.....	209,801	$13,546	$8,728	$.....	$31,316	$1,179	$54,769	26.1	$155,032	$119,123	$90,686	$81,803
	12 mos.	20	2,002,278	.....	2,225,811	255,891	99,315	.....	424,440	14,267	793,913	35.7	1,431,898	996,389	638,182	993,704
New York, Ontario & Western	Dec.	568	672,653	37,369	849,542	71,458	144,092	11,401	369,613	26,002	626,001	73.7	223,541	200,240	123,378	16,580
	12 mos.	568	8,493,909	1,119,722	11,342,979	1,278,917	1,948,725	173,639	4,486,497	330,660	8,250,514	72.7	3,092,465	2,627,575	1,769,353	883,267
Norfolk & Western	Dec.	2,268	5,454,941	202,250	5,897,680	727,089	1,181,587	118,269	1,563,646	263,887	3,868,686	65.6	2,028,994	1,353,642	1,511,037	2,513,503
	12 mos.	2,259	74,293,922	2,638,216	79,854,748	9,715,056	15,368,790	1,516,369	20,750,502	3,125,312	50,594,814	63.4	29,259,934	21,104,626	22,977,506	33,640,859
Norfolk Southern	Dec.	932	318,434	11,507	355,230	61,770	69,181	22,546	175,822	23,567	350,706	98.7	4,524	—24,058	—35,111	49,392
	12 mos.	932	5,538,543	183,061	6,017,064	942,470	938,643	297,908	2,487,073	295,030	4,957,423	82.4	1,059,641	530,325	338,109	743,010
Northern Pacific	Dec.	6,735	3,309,132	414,908	4,181,196	191,899	983,570	181,963	1,850,749	389,135	3,661,030	87.6	520,166	797,786	1,034,089	956,566
	12 mos.	6,780	50,823,027	5,472,083	62,312,087	7,760,727	14,028,210	2,354,376	23,761,093	3,220,095	52,082,847	83.6	10,229,240	3,402,780	6,801,420	14,293,213
Northwestern Pacific	Dec.	441	106,085	89,050	223,928	69,605	48,118	5,623	161,102	18,867	303,267	135.4	—79,339	—110,281	—120,823	—158,491
	12 mos.	441	2,415,133	1,330,836	4,153,264	897,285	672,300	70,354	2,117,170	205,589	3,958,181	95.3	195,083	—207,066	—341,963	—52,045
Oklahoma City-Ada-Atoka	Dec.	132	32,704	1,140	35,932	9,608	6,669	1,117	12,944	2,650	32,642	90.8	3,290	—1,799	—9,998	—18,192
	12 mos.	132	604,068	15,969	649,665	174,508	52,472	15,776	198,407	34,886	468,601	72.1	181,064	120,368	—11,494	—39,846
Pennsylvania Railroad	Dec.	10,914	20,892,712	6,177,590	30,798,606	2,476,726	7,181,193	709,663	13,623,435	1,520,376	25,890,940	84.1	4,907,666	3,385,348	2,259,167	3,836,206
	12 mos.	10,914	315,184,241	86,817,698	448,090,279	49,775,170	93,244,042	9,165,632	175,832,116	18,769,939	352,865,931	78.7	95,224,348	65,166,731	51,055,806	92,341,353
Long Island	Dec.	404	602,693	1,749,134	2,501,521	234,637	332,049	16,854	1,162,166	63,456	1,808,703	72.3	692,818	542,254	324,815	568,840
	12 mos.	404	9,365,074	24,809,301	36,036,402	3,312,283	5,182,850	206,342	14,525,472	729,573	23,958,429	66.5	12,077,973	9,582,294	7,217,786	7,995,447
Peoria & Pekin Union	Dec.	17	8,258	Dr. 18	71,375	6,332	21,943	2,322	45,790	8,133	84,520	118.4	—13,145	—20,145	—550	28,384
	12 mos.	17	102,659	4,448	1,067,870	139,818	134,917	54,152	558,475	91,338	978,700	91.6	89,170	—85,130	188,730	424,622
Pere Marquette	Dec.	2,264	1,812,941	91,572	2,023,022	305,394	396,508	59,919	841,187	99,973	1,710,207	84.5	312,815	180,659	85,491	—125,238
	12 mos.	2,264	24,170,367	1,493,686	27,344,681	4,579,837	5,395,088	842,186	10,960,999	1,261,779	23,132,174	84.6	4,212,507	2,460,172	1,284,565	4,541,164
Pittsburgh & Shawmut	Dec.	102	69,531	668	70,857	10,270	19,872	1,611	19,883	4,022	55,658	78.6	15,199	14,149	13,960	21,984
	12 mos.	102	917,909	11,961	938,561	128,683	244,236	19,752	249,678	49,112	691,461	73.7	247,100	232,097	240,603	305,737
Pittsburgh & West Virginia	Dec.	138	183,722	123	201,637	15,985	50,185	14,043	44,033	13,089	145,219	72.0	56,418	32,479	49,230	74,740
	12 mos.	119	2,616,745	19,813	2,905,143	314,705	768,171	219,583	644,488	200,010	2,248,405	77.4	656,738	330,578	625,021	1,555,311
Pittsburgh, Shawmut & Northern	Dec.	198	90,888	360	94,284	16,580	26,538	1,357	34,742	6,746	85,963	91.2	8,321	7,970	4,658	5,930
	12 mos.	198	1,244,187	4,595	1,273,789	231,499	240,561	18,724	442,000	81,396	1,014,180	79.6	259,609	228,372	182,964	153,536
Quincy, Omaha & Kansas City	Dec.	249	28,005	3,059	36,192	17,916	7,304	491	27,089	2,071	54,512	150.6	—18,320	—17,899	—20,164	—18,314
	12 mos.	249	411,398	37,551	509,430	243,614	63,715	9,558	239,774	25,533	580,256	113.9	—70,826	—122,763	—152,542	—62,076
Reading	Dec.	1,458	4,387,091	372,747	5,141,863	181,976	1,012,177	81,701	2,230,285	234,340	3,761,671	73.2	1,380,192	1,358,403	1,338,506	1,391,612
	12 mos.	1,456	61,514,854	4,573,328	70,614,089	9,194,346	17,031,875	1,086,185	28,864,489	2,592,697	59,025,460	83.6	11,588,629	9,300,824	8,994,703	12,644,507
Atlantic City	Dec.	163	78,453	40,020	130,127	33,202	16,524	3,004	131,328	9,259	193,426	148.6	—63,299	—97,343	—102,348	—90,836
	12 mos.	163	1,177,289	1,355,307	2,711,189	537,456	249,671	51,176	1,858,899	60,883	2,759,933	101.8	—48,744	—528,784	—637,823	—845,601
Richmond, Fredericksburg & Potomac	Dec.	117	345,707	173,204	708,585	47,344	128,443	8,545	243,171	34,859	472,091	66.6	236,494	190,457	145,614	187,798
	12 mos.	117	4,818,777	2,371,023	8,915,245	903,455	1,732,590	116,552	3,300,979	434,267	6,677,195	74.9	2,238,050	1,804,610	1,167,742	1,307,836
Rutland	Dec.	413	178,492	42,002	321,450	58,704	71,977	12,016	157,360	14,942	300,637	93.5	20,813	—8,105	—5,547	30,399
	12 mos.	413	2,694,681	690,973	4,541,812	899,651	880,133	143,093	1,964,242	196,656	4,076,185	89.7	465,627	197,125	254,242	606,140
St. Louis-San Francisco	Dec.	5,266	2,769,163	374,432	3,517,859	472,988	812,048	113,637	1,391,177	176,739	2,998,138	85.2	519,721	176,752	160,783	1,123,012
	12 mos.	5,266	44,456,796	5,281,036	54,426,916	6,078,010	10,022,768	1,410,338	19,704,822	2,357,378	39,964,080	73.4	14,462,836	10,290,013	9,902,423	16,702,186
Ft. Worth & Rio Grande	Dec.	233	32,858	Dr. 694	38,555	19,835	12,312	2,819	32,561	4,278	71,723	186.0	—33,168	—39,796	—47,253	—29,700
	12 mos.	233	548,678	37,200	670,502	220,061	158,927	36,852	407,016	48,844	870,619	129.8	—200,117	—256,716	—362,669	—294,654
St. Louis-San Francisco & Texas	Dec.	262	92,718	Dr. 1,097	98,124	17,091	21,400	5,532	49,200	7,924	100,957	102.9	—2,833	—10,799	—47,460	—11,735
	12 mos.	262	1,303,638	63,870	1,429,137	270,889	234,889	70,435	616,461	92,911	1,285,991	90.0	143,146	88,068	—280,813	—41,734
St. Louis Southwestern Lines	Dec.	1,913	1,254,730	34,251	1,382,069	122,247	188,644	93,810	437,112	78,734	918,961	66.5	463,108	382,184	300,978	59,472
	12 mos.	1,913	16,385,466	435,326	17,950,372	1,963,175	2,613,083	1,126,188	5,930,225	964,199	12,659,230	70.5	5,291,142	4,220,892	2,607,346	2,219,328
San Diego & Arizona	Dec.	155	27,301	9,951	39,680	9,077	12,868	2,696	18,092	6,849	50,213	126.5	—10,533	—15,024	—12,507	—6,633
	12 mos.	155	564,931	146,473	737,336	149,399	167,872	38,270	252,188	82,894	702,770	95.3	34,566	—25,773	—864	143,444
Seaboard Air Line	Dec.	4,469	2,467,364	334,689	3,073,436	573,853	603,088	143,361	1,222,513	170,657	2,719,595	88.5	353,841	180,148	60,267	302,720
	12 mos.	4,479	34,014,178	4,245,198	42,303,665	6,936,608	8,328,002	2,083,392	15,893,709	2,097,597	35,649,906	84.3	6,653,759	3,461,592	2,578,649	5,817,039
Southern Ry.	Dec.	6,730	5,185,308	982,134	6,813,301	920,484	1,594,918	156,120	2,828,744	335,701	5,888,715	86.4	924,586	525,537	349,800	2,007,984
	12 mos.	6,730	77,440,284	12,312,558	97,715,111	15,028,650	20,429,088	2,454,163	37,168,431	4,001,978	79,783,959	81.7	17,931,152	10,599,494	8,281,106	19,708,163
Alabama Great Southern	Dec.	315	278,845	56,897	368,815	10,440	79,450	11,964	154,291	21,685	281,547	76.3	87,268	62,113	66,336	318,409
	12 mos.	315	4,845,492	787,717	6,087,004	1,213,060	1,472,513	188,485	2,192,940	257,191	5,375,690	88.3	711,314	240,584	355,769	1,327,268
Cinn., New Orleans & Tex. Pac.	Dec.	338	755,796	93,668	918,064	88,073	231,286	14,515	260,642	49,646	649,495	70.7	268,569	266,958	263,828	458,687
	12 mos.	338	12,154,928	1,338,858	14,388,299	2,580,700	3,538,655	391,280	4,337,939	628,693	11,550,826	80.3	2,837,473	2,046,079	2,046,108	3,620,613

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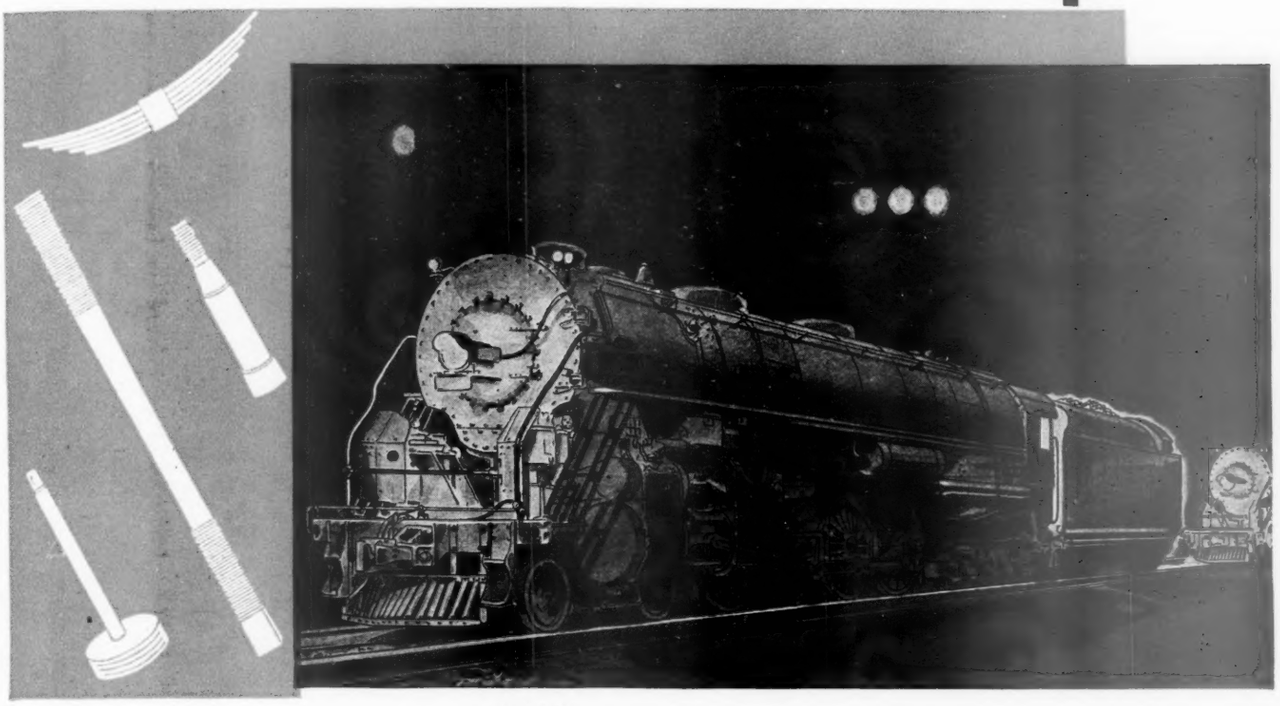

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CENTRAL ALLOY DIVISION

REPUBLIC STEEL CORPORATION

Massillon, Ohio

Revenues and Expenses of Railways

MONTH OF DECEMBER AND TWELVE MONTHS OF CALENDAR YEAR 1931—CONTINUED

Name of road		Av. mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Operating income (or loss).	Net ry. operating income.	Net ry. operating income, 1930.
Georgia Southern & Florida	Dec.	397	$128,729	$28,321	$180,258	$1,188	$47,193	$1,775	$71,791	$2,527	$127,384	70.7	$52,874	$58,406	$66,382	$35,145
	12 mos.	397	2,101,708	477,157	2,819,200	597,762	687,593	23,330	1,037,229	32,077	2,423,752	86.0	395,448	178,099	201,111	373,567
New Orleans & North Eastern	Dec.	204	147,465	29,047	195,510	7,728	52,978	4,183	66,613	12,320	145,810	74.6	49,700	25,038	13,956	78,742
	12 mos.	204	2,428,127	394,522	3,049,995	548,929	738,038	107,258	1,139,495	162,779	2,724,991	89.3	325,004	—123,068	—349,157	274,575
Northern Alabama	Dec.	110	46,534	1,162	49,394	1,950	1,845	972	20,103	2,636	27,506	55.7	21,888	16,739	12,557	20,289
	12 mos.	110	637,406	20,052	681,754	185,338	26,502	17,992	254,049	32,559	516,356	75.7	165,398	100,840	—61,551	69,769
Southern Pacific	Dec.	9,113	6,210,026	2,095,359	9,451,159	1,163,558	1,543,293	323,340	3,828,198	596,408	7,695,187	81.4	1,755,972	553,414	332,857	1,892,163
	12 mos.	9,120	105,417,075	27,171,029	146,117,981	17,094,974	23,891,872	4,194,321	52,095,789	7,201,882	107,434,090	73.5	38,683,891	24,665,555	19,672,456	35,139,394
So. Pacific Steamship Lines	Dec.	....	345,302	19,992	391,634	14,713	34,972	14,969	325,675	32,204	422,533	107.9	—30,899	—15,856	—15,987	—127,152
	12 mos.	....	5,384,188	493,369	6,262,145	239,054	1,439,485	236,242	4,692,197	381,221	6,988,199	111.6	—726,054	—725,109	—726,377	—465,724
Texas & New Orleans	Dec.	4,653	2,168,521	409,879	2,971,933	490,153	659,501	141,426	988,738	240,440	2,542,895	85.6	429,038	234,710	31,300	581,089
	12 mos.	4,690	35,831,388	5,483,241	46,262,050	7,327,166	8,848,246	1,845,807	16,281,612	2,796,048	37,286,260	80.6	8,975,790	5,874,893	3,018,288	8,425,476
Spokane, Portland & Seattle	Dec.	555	280,499	49,220	373,821	15,115	63,172	10,864	155,852	24,892	271,135	72.5	102,686	69,416	71,146	—72,913
	12 mos.	555	4,927,549	648,806	6,127,728	714,835	930,193	139,723	2,020,698	280,279	4,105,992	67.0	2,021,736	1,028,919	918,449	1,131,176
Tennessee Central	Dec.	295	156,100	5,234	170,297	20,698	22,021	7,199	68,461	11,130	129,285	75.9	41,012	41,000	28,265	43,373
	12 mos.	295	2,397,105	85,917	2,603,511	468,849	412,401	99,339	965,826	157,047	2,100,068	80.7	503,443	442,447	258,588	408,560
Terminal R. R. Assn. of St. L.	Dec.	55	.....	.....	507,112	74,757	42,334	3,967	281,847	20,779	426,698	84.1	80,414	17,298	93,402	152,653
	12 mos.	55	.....	.....	7,767,452	999,939	693,783	47,581	3,815,686	267,066	5,859,135	75.4	1,908,317	903,813	1,800,340	2,286,148
Texas & Pacific	Dec.	1,950	1,559,044	266,902	2,110,156	292,372	397,831	70,290	705,771	98,746	1,562,788	74.1	547,368	533,977	448,291	707,628
	12 mos.	1,951	24,005,005	3,282,023	30,007,959	3,647,693	4,954,847	942,363	9,519,389	1,369,364	20,614,630	68.7	9,393,329	7,879,608	5,870,317	7,235,687
Texas Mexican	Dec.	162	38,438	1,093	Dr. 240	13,580	5,469	3,091	Cr.27,180	6,612	385	—160.4	—625	—7,459	—4,497	7,477
	12 mos.	162	699,260	18,692	785,853	170,929	167,049	40,170	349,823	87,735	809,986	103.1	—24,133	—86,177	—143,727	35,283
Toledo, Peoria & Western	Dec.	239	93,890	58	96,036	15,531	9,674	13,040	42,819	9,120	90,184	93.9	5,852	5,625	—2,213	20,468
	12 mos.	239	1,579,414	1,065	1,612,972	308,951	154,482	176,419	572,430	109,850	1,322,132	82.0	290,840	239,399	144,294	311,908
Toledo Terminal	Dec.	28	.....	.....	65,515	24,525	12,629	582	34,398	6,306	78,440	119.7	—12,925	—17,483	1,123	29,943
	12 mos.	28	.....	.....	982,927	154,376	159,267	6,952	419,472	59,556	799,561	81.3	183,366	17,947	296,563	312,156
Ulster & Delaware	Dec.	128	16,344	41	48,368	14,395	12,574	1,020	29,695	3,095	60,779	105.7	—12,411	—22,097	—23,498	—12,991
	12 mos.	128	353,869	108,993	897,363	183,303	142,665	13,152	462,869	43,196	845,185	94.2	52,178	—21,231	—50,795	—9,064
Union R. R. of Penna.	Dec.	45	.....	.....	233,754	51,003	79,547	138	139,531	16,662	286,881	122.7	—53,127	—58,982	—19,276	—160,619
	12 mos.	45	.....	.....	4,860,713	851,005	1,594,320	1,900	2,309,563	173,434	4,930,181	101.4	—69,468	266,178	852,883	2,108,522
Union Pacific	Dec.	3,768	4,624,149	621,105	5,964,220	282,594	991,879	150,997	1,939,178	330,370	3,784,620	63.5	2,179,600	2,267,095	2,086,629	1,799,523
	12 mos.	3,766	71,641,391	9,351,597	89,253,104	8,511,132	17,971,241	1,951,374	26,283,390	4,064,119	60,255,553	67.5	28,997,551	23,517,715	19,760,956	25,560,511
Oregon Short Line	Dec.	2,505	1,507,070	156,616	1,841,078	119,546	246,149	41,601	697,190	116,135	1,252,869	68.1	588,209	439,827	351,775	468,191
	12 mos.	2,528	22,878,866	2,151,850	27,147,619	3,893,363	4,157,295	608,777	8,750,612	1,481,665	19,403,120	71.5	7,744,499	4,607,204	3,407,026	6,148,561
Oregon-Wash. R. R. & Nav. Co.	Dec.	2,338	889,715	167,790	1,234,986	149,197	149,403	74,695	597,658	114,783	1,096,446	88.8	138,540	225,178	210,844	90,088
	12 mos.	2,337	15,466,775	1,728,188	19,322,486	3,215,013	2,705,598	839,372	7,745,129	1,442,571	16,133,708	83.5	3,188,778	1,341,601	1,469,969	1,329,520
Los Angeles & Salt Lake	Dec.	1,249	1,004,594	186,208	1,334,580	93,477	153,352	88,355	498,432	78,088	951,894	71.3	382,686	238,243	120,775	100,115
	12 mos.	1,247	14,238,897	2,845,583	18,845,202	2,663,071	2,802,169	861,692	6,217,732	997,437	14,159,013	75.1	4,686,189	2,908,252	1,387,480	2,259,130
St. Joseph & Grand Island	Dec.	258	180,281	4,223	193,659	24,086	23,691	3,196	74,075	15,762	140,810	72.7	52,849	49,266	29,852	43,331
	12 mos.	258	2,921,799	53,817	3,105,091	532,012	387,734	40,846	1,026,677	205,030	2,206,064	71.0	899,027	727,577	400,346	690,950
Utah	Dec.	111	208,036	.....	208,928	2,877	23,348	444	46,128	5,076	77,873	37.3	131,055	111,885	91,405	75,577
	12 mos.	111	1,360,173	36	1,366,059	168,403	318,925	4,466	313,464	69,242	872,891	63.9	493,168	377,985	216,225	267,282
Virginian	Dec.	608	1,098,209	10,404	1,173,376	79,437	211,306	15,675	236,086	32,155	573,934	48.9	599,442	454,442	550,310	716,402
	12 mos.	593	14,333,297	156,906	15,337,426	1,476,757	2,758,129	196,757	3,251,642	388,770	8,066,172	52.6	7,271,254	5,411,182	6,345,611	7,415,869
Wabash	Dec.	2,523	2,634,162	307,536	3,210,606	291,798	593,980	172,996	1,593,125	200,441	2,869,116	89.4	341,490	127,156	—235,004	892,318
	12 mos.	2,523	41,525,531	3,984,709	49,163,326	5,421,979	9,052,869	2,343,358	22,197,142	2,736,483	42,024,255	85.5	7,139,071	4,485,520	—366,995	7,711,675
Ann Arbor	Dec.	293	244,012	4,487	257,274	30,295	56,565	10,086	139,663	11,736	248,013	96.4	9,261	—20,687	—39,571	26,662
	12 mos.	293	3,757,150	72,988	3,980,505	390,612	792,982	185,000	1,866,943	183,802	3,420,015	85.9	560,490	287,751	22,643	533,514
Western Maryland	Dec.	891	1,034,066	8,088	1,098,639	110,967	152,769	44,587	289,494	100,587	705,236	64.2	393,403	364,741	347,339	402,992
	12 mos.	892	13,929,941	122,428	14,811,053	1,959,383	2,543,695	530,026	4,005,487	556,281	9,647,901	65.1	5,163,152	4,319,490	4,343,199	5,253,239
Western Pacific	Dec.	1,051	840,050	33,729	934,571	107,400	169,393	63,582	440,876	50,031	835,632	89.4	98,939	11,619	—13,709	—30,365
	12 mos.	1,051	11,079,323	772,732	12,914,527	2,118,535	2,226,652	801,920	5,464,626	573,599	11,439,804	88.6	1,474,723	367,564	263,270	1,910,761
Wheeling & Lake Erie	Dec.	511	607,911	6,005	650,474	23,352	179,541	30,486	270,099	69,818	571,559	87.9	78,915	53,938	45,664	—29,340
	12 mos.	511	10,801,142	102,528	11,617,713	1,378,756	3,016,427	410,380	3,929,850	514,481	9,256,066	79.7	2,361,647	1,246,933	1,186,801	3,052,945
Wichita Falls & Southern	Dec.	203	50,419	108	52,325	12,727	6,247	2,240	11,915	3,109	35,354	67.57	16,971	22,971	19,043	108,867
	12 mos.	203	637,652	1,061	661,275	129,402	96,307	28,283	205,203	40,576	494,022	74.71	167,253	125,774	77,769	224,661